MAR 21 1924


# AMERICAN JOURNAL of PHARMACY

SINCE 1825

A Record of the Progress of Pharmacy and the Allied Sciences



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Vol. 96 MARCH, 1924 No. 3

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NOTICE OF COLLEGE MEETING: The Annual Meeting of the members of the Philadelphia College of Pharmacy and Science will be held on Monday, March 31, 1924, at 2:30 P. M. at the College, 145 N. 10th St., Philadelphia, Pa. (Reports of Standing Committees. Election of Officers and Trustees. Reports of Special Committees. General Business).

AMBROSE HUNSBERGER, Recording Secretary.


Price $3.00 per Annum in Advance. Foreign Postage, 25 Cents Extra.
Single Numbers, 30 Cents. Back Numbers, 50 Cents.

Entered as Second-Class Matter at the Post Office at Philadelphia, Pa., Under the Act of March 3, 1879.

Acceptance for Mailing at Special Rate of Postage Provided for in Section 1103, Act of October 3, 1917. Authorized February 16, 1920.

PUBLISHED MONTHLY BY THE
Philadelphia College of Pharmacy and Science
145 North Tenth Street, Philadelphia

# American Journal of Pharmacy

ESTABLISHED IN 1825

Four preliminary numbers were published at different times until in 1829, when the publication of the regular volumes began. Since then the publication has been uninterrupted. During the period from 1829 to 1852 four numbers were published annually, except in 1847, when five numbers were published. From 1853 to 1870 six numbers were published. Since this time twelve numbers have been published annually.

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THE AMERICAN
JOURNAL OF PHARMACY

VOL. 96. MARCH, 1924. No. 3.

# EDITORIAL

## "THE RETURN OF THE SPIRITS."

The admission of whiskey and kindred spirits back into the Pharmacopœial fold has been the subject of much recent newspaper comment. As usual there is a diversity of opinion regarding the benefit which may or may not accrue following such official recognition. Generally, however, it is agreed that so long as the prohibition law qualifies these spirits as legitimate therapeutic agents the Pharmacopœia, which is the Government's authority for affirming medicinal standards, should undoubtedly have stated requirements for the purity of whiskey and brandy.

Physicians rather uniformily agree that whiskey is a valuable medicinal. The country, however, has opinionated that whiskey is a dangerous drug when used for other than medicinal purposes, and has accordingly entered it upon its constitutional articles as a banned imbibition except when administered under competent medical supervision.

Practically the same thing has been done with the narcotic drugs, such as morphine, cocaine, heroin, etc. Yet the prohibition of these habit-forming drugs from general consumption did not banish them from the book of medicinal standards. Nor indeed has the inclusion of these narcotics in the Pharmacopœial lists ever given them any greater vogue or wider use, as argued by some who are against the Pharmacopœial recognition of medicinal spirits.

One pessimistic editorial writer of a daily newspaper fears that "the adoption of such legal standard may be expected to boom the demand for prescriptions. It will offer the only assurance of the 'real stuff' if the prescriber and prescription filler pay more attention to the laws of the U. S. Pharmacopœia than they do to the prohibition statutes."

The fact of the matter, however, is that legitimate medicine and legitimate pharmacy, which are largely predominant despite the fears of uninformed newspaper scribblers, will be glad to find whiskey and brandy placed where they legally belong, behind the bars of the Pharmacopœia. Thus will the Government have in its hands a potential factor towards the prosecution of those who sell upon prescription or otherwise, vile and vicious stuff masquerading under the official titles. The conscienceless druggist who can now sell with impunity, upon prescription, diluted or sophisticated distilled spirits, will no longer find it safe to supply anything but that which comes up to official standards; and the wholesaler will likewise find it necessary to handle only standardized liquors.

Indeed even the bootlegger will feel the two-edged sword of the new order of things, for once the Pharmacopœia provides standards for whiskey it can hold that prosperous law-breaker for a double crime, for when he sells his vicious stuff as "whiskey" he is not only amenable to prosecution under the Prohibition statute, but also under the Pure Food and Drugs Act.

By all means, then, let these spirits back to the official book, although providing adequate standards for them may prove today just as difficult as in those hectic days when Doctor Wiley held the stage and championed all things pure.

IVOR GRIFFITH.

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## "THE DRUGLESS DRUG STORE."

Not an institution fostered by the Christian Scientists—not another fad advanced by a co- or an anti- society into an already fad-ridden community—but an honest-to-goodness creation of real business people, admittedly designed for the primary purpose of making money.

The United Cigar Stores, who are the sponsors of this new venture, recently opened their first so-called drugless drug store in New York City. This is stated to be the forerunner of similar institutions in every city where such stores might be profitably conducted. It is conceivable that such a venture may prove quite successful, particularly in view of the fact that its backers are well-versed in the art of chain store management, and are not jumping into such a

peculiarly novel proposition without having reckoned the cost and fully considered its possibilities.

Can it be the first sign of the inevitable divorce of the commercial from the professional pharmacy?

Is it a menace to legitimate pharmacy, to the time-honored corner drug store that has come to be a very serviceable and respected part of our community life?

Can organized pharmacy do anything to prevent this impertinent foray into its own privileged traditional territory?

These are questions that have been propounded in current drug journals.

The last question may be readily countered by asking—did the organized confectionery trade, or the associated booksellers, or the amalgamated talking-machine sellers ever do anything (but talk) to prevent the impertinent foray of the drug store man into their own privileged, restricted sales territory, in candy, in book and victrolas—not mentioning hot roast beef sandwiches, hair nets and alarm clocks?

Is it a menace to legitimate pharmacy? We think not. No institution founded on an admittedly unsound ethical substratum has ever proven time-worthy. The United Stores interests belied their reputed business ethics when they chose the unfortunate name—the drugless drug store—for their new commercial prodigy. As ridiculous and impossible as a meatless butcher shop or a shoeless shoe shop—this coined phrase in addition to its vacuity and silliness, is symptomatic of dishonesty and fraud.

A drug store, however, has a recognized legal identity, and irrespective of any qualifying or modifying terms, it must first of all be a drug store, a place where drugs are sold and prescriptions compounded. All other activities are secondary. But the drugless drug store is a designed mouse-trap to entice customers into an establishment that is conducting a business under false pretense, for obviously a drug store is not a drug store unless it dispenses drugs. A business establishment describing itself as a drugless drug store does so only because it derives some benefit, a covert benefit, an unfair, dishonest benefit, by masquerading as something which it is not.

It is just as unethical—as dishonest—for anyone to call such a store a drugless drug store—as it would be unethical for one to label a cigar store, red-fronted and shielded with the customary crest and the other ear-marks of the United Stores, with a small red sign marked, *"This is not a* **UNITED CIGAR STORE.**"

Such procedure however would not be illegal, but it would certainly be a gross breach of business ethics and a great handicap to success.

For the erstwhile keen business heads of the company mentioned to countenance such a name to describe their New York venture, puts them in a class with the hatter who advertises a Setson hat with the hope that the unobserving buyer will confound a false brand with the famous brand of hat that covers more than a continent.

Legitimate pharmacy has nothing to fear from such covert competition. Chain stores have come and chain stores have gone but the little community store on our street corner continues to carry on and on, and it will continue as long as people prefer personal, intimate, human service to the calculating clangs of the chain store cash register.

IVOR GRIFFITH.

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# ORIGINAL ARTICLES

## IDIOSYNCRASIES, OR THE STORY OF A SNEEZE.*

**Ivor Griffith, P. D., Ph. M.**

**Physiological Chemist, Stetson Hospital of Philadelphia; Assistant Professor of Pharmacy, Philadelphia College of Pharmacy and Science.**

Idiosyncrasy is the term applied to a characteristic possessed by certain individuals whereby they are disagreeably affected, or even violently dislike things that are harmless or agreeable to a large majority of their kind. The word itself is not so very common, but the occurrence of the quality which it describes is only too common, and there is probably not a single person in this room tonight, who can honestly profess in the words of that famous song of songs, "Yes, we have no idiosyncrasies today."

Indeed idiosyncrasies are often highly desirable qualities and for some purposes they are considered exceedingly fashionable. The whole world revolves around them, for if we had them not, what a harmless lot of standardized, systematized, pattern-made mollycoddles we would be. If we all liked the same things, if the same things all liked us—if we all thought the same way, if we all reacted alike to

*One of a Series of Popular Lectures given at the Philadelphia College of Pharmacy and Science, season 1924.

the same impulses—if we all behaved alike, if we all looked alike—and we would if our respective and respectable body cells were likewise devoid of idiosyncrasies—what an uninteresting, inert, inane and inanimate crowd of protoplasmic puddingheads we would all be. We should, therefore, be properly thankful for some kinds of idiosyncrasies. Others are nuisances and are to be treated as such.

Now there are innumerable types of idiosyncrasies. Roughly speaking, however, these peculiarities or antipathies as they are called, may be classed into two groups, namely, the congenital kind and the acquired kind, and I may say that there are certain borderline cases that may be argued into either class. The congenital are those which come to their proprietors through a generous provision of heredity. They are the genealogical idiosyncrasies that may be very conveniently, and sometimes quite properly attributed to the queer caprices of a great grandfather in the remote ago. For some odd reason or another, grandfather always gets the blame for anything uncanny that comes to ail his progeny despite the fact that the Bible in its oft-repeated classic, *"even unto the third generation,"* carefully avoids making a sex distinction. So whether the congenital idiosyncrasy may be dietary, emotional or etiologic, we often hear, "Well, his grandpap never liked pumpkin pie, either," or "His grandpap had an awful temper, too," or "No wonder—his grandfather had the hay fever, too." Poor old grandpap!

So we dispense for the moment with the idiosyncrasies of true heredity.

The other class—the idiosyncrasies of environment, may be further subdivided into the truly innate, organic idiosyncrasies acquired through physiologic or psychologic causes, and the idiosyncrasies of eccentricity and caprice suggested by a resourceful perversion and perpetuated by force of habit.

Of the first mentioned, namely, the truly innate organic acquired idiosyncrasies, might be mentioned as example, one due to a child having been injudiciously terrified with some object, the mental impression becoming fixed and permanent. Antipathies of this sort also come from mental association, often unconscious or subconscious, of one object with another admittedly displeasing and repugnant, or perhaps with some painful or distasteful experience in the past life of the person affected. For instance the writer has a distinct idiosyncrasy to grape juice, despite Mr. Bryan's intemperate advocacy of this temperate imbibition. He can date this antip-

athy—which has by this time evolved from the psychologic to the physiologic—to a rare day in June when to conceal his incursion and raid upon his good mother's store of home-pressed grape juice, he found it necessary to conceal in and about his person, all liquid evidences of his petty larceny by drinking without let-up the total contents of a quart bottle of lukewarm grape juice. Since then, and by virtue of some unconscious contract, his stomach has come into full accord with his mind, and today grape juice to this person is not a pleasing drink but a nauseant vile concoction, only to be indulged in when an emetic is required.

Sometimes a true poisoning is improperly called an idiosyncrasy. For instance, were it not indelicate I might mention an affair which a certain small family had with a sextette from Lucifer of decrepit, ill-bred and malevolent oysters. Henceforth to this same small family Bivalve, New Jersey, is in the Tropic of Capricorn, and oysters are rare minerals.

The second class in the group of acquired antipathies comprehends the so-called idiosyncrasies of eccentricity and caprice suggested by a resourceful perversion and perpetuated by force of habit. These are not true idiosyncrasies. "John doesn't take sugar in his coffee," or "Bill never uses salt," "Doris cannot take castor oil"—these were all caprices originally—eventually they became an ingrained habit. John doesn't take sugar in his coffee today—not because he has an aversion to sweet things—not because his body cells are sweet enough and require no further saccharization, but probably because John when he was a boy, thought it was smart to be different from the common run of coffee drinkers. Or John felt that his existence was being ignored at the dining table or in his mother's sewing circle, and so he set himself apart as a different person simply by denying himself the cosmopolitan sugar. John early in life thus gained a peculiar publicity, and the habit he started then becomes part of his daily drudge—to satisfy a foolish whim he victimizes himself for life—becomes a sugar hater, and dies totally ignorant of the blessed sweetness of a cup of good coffee. In this connection it might be recalled that the well-known advice of "The Duchess" in "Alice":

> "Speak gently to your little boy,
> And beat him if he sneezes;
> He only does it to annoy,
> Because he knows it teases,"

contains much sound advice as well as some unsound. Confirmation of this belief is now produced by the National Committee for Mental Hygiene.

For its report agrees with the theory of all but the second line of the verse; but it is emphatic in the statement that youngsters soon learn whether tantrums are profitable or otherwise. If they feel they can get something out of them they proceed to have them as occasion demands.

Take the tobacco habit. The body cells cordially hate it when with its juices "they are first acquent." Normally the human body is antagonistic to tobacco and its ingredients. This is the proper viewpoint to take of the tobacco habit, and in this I am bound to be supported by a certain group of well-meaning old ladies of both sexes, whose present endeavor is to eradicate from this land of the free and the home of the rave the pernicious, life-destroying weed familiarly known under such *nom de plumes* as Camels, Cincos and cut plug. I may be pardoned for referring at this point again to a strictly personal matter on the ground, perhaps, that it has been a strictly personal matter with most of the gentlemen in this audience. I say gentlemen advisedly, although it is alleged and rumored that this pernicious habit is extending its engulfing and paralyzing tentacles into feminine circles heretofore considered immune to its vicious influences.

But that is another story—we men all agree, however, that if the weed plays fair and exacts from its lady initiates the nauseating, quintessence of seasickness that it exacted from us, its primary shriners, we shall never complain. By the way the stanza that Thomas Hood left out of his immortal "I Remember"—is now in public print for the first time.

"I remember, I remember
My first tobacco spree,
The little corner of the plug
That Bob bestowed on me.
Now swallow hard—that's what he said,
And I obeyed, of course,
They took me home a limpid lump
Of over-ripe remorse."

And that, I am certain, is the common experience of all devotees of the weed when first they try its tempting lure.

Around and about the boy's first cigarette or chew of strong tobacco are pressed in never-to-be-forgotten discomfort and discontent—life's darkest, dankest, deepest moments. Generally from then on, however, devotion to the weed is certain. The antipathy exhibited to the tobacco upon the first trial is quickly changed to honest regard, and in a few weeks, months or years, the habit has so grown upon the devotee that not good sense, regard for sanitation, or even the beseeching requests of a lady love can make him forego his old corn cob or his filthy cut of plug. To be satisfied with this statement one only has to watch the honest satisfaction beaming on an old man's face as he sits in his slippers by the fireside, unconsciously conducting an experiment in destructive distillation, a capacious meerschaum still hiding his countenance, and himself filling the part of an aspirating worm condenser. What a wealth of content he seems to extract out of that luring weed and not even the Shah of Persia smoking his golden chandelier is happier than the bronzed old man condensing the vapors from a clay retort, holding back that which is good and chimneying out in coiling wreaths the incondensible smoke. By the way, I am told of the invention of a smokeless cigar. As a curiosity it may be interesting, but as a commodity it is worthless. For despite the gaudy lithograph upon the cigar band, and despite the extra coupons, no real man would ever indulge in a cigar that did not offer special attraction by way of smoke, that wisps and curls and purls and spins in endless syncopation.

But the tobacco habit, despite the fact that the body cells are eventually taught to expect their daily dose of nicotine, belongs to the class of capricious and unnecessary idiosyncrasies. An exertion of the will, conducted after clever propaganda and governed by proper principles, is always able to remove such a habit provided it is conceived at a season of the year removed from the New Year and its ephemeral resolutions.

Returning now to the broad grouping of idiosyncrasies, which includes the truly innate inherited and acquired antipathies, we find here the group to which we shall dedicate our attention for the rest of our lecture period. We refer to those antipathies or idiosyncrasies which are not conscious caprices, and which an exertion of the will cannot by any means remove. Antipathies are they which are part of the body economy—queerness and caprices of the involuntary cells or cell groups of the individual. Here mind has no power over matter for of some of these intolerances we can say

with correctness that the persons afflicted frequently have no mental aversion to the disturbing article and no emotional control over its peculiar behavior. For instance, some medicines affect particular persons dangerously, even when given in doses much smaller than the normal or average amounts. These medicines act so not because they are distasteful to the mental make-up of the tastee but because the body cell itself resents them. Quinine may be tolerated by some persons in teaspoonful doses—the same dose or even a tenth part of it, might kill another, who exhibits the cell antipathy to it. That is true of all articles of medicine, and particularly so of a few, which because of some un-understood peculiarity in their consumers react in this erratic way. Many alkaloids such as quinine, strychnine, atropine, emetine, the salicylates, benzoates and other organic as well as inorganic drugs behave in this irregular way. The drugs afford no legitimate, reasonable excuse for their hectic abnormalities. And indeed they need not for the blame rests entirely upon the person to whom they are being administered.

It is this erratic record of medical treatment that keeps medicine, at least internal medicine, out of the ranks of science, and labels it art. Surely any practice depending upon irregular, erratic and empiric applications as medicine does can not be truly called a science. More correctly it is art. Certainly two five-grain quinine pills—the first curing one man's cold, and the other killing its swallower, cannot be termed in high-brow lore, pert instruments of precision.

Then there is the dope habit, which like the tobacco habit, is not a true idiosyncrasy, but rather a converse idiosyncrasy—for these unfortunate habitues acquire not a sensitiveness but a quantitative tolerance for material that to the normal person is nothing short of poison. The morphine or heroin fiend starts with very little capital—a quarter grain is generally enough to soothe their pervert lust—but soon this miserly dose has lost its power and double the quantity is needed. By this token the necessary dose climbs to unbelievable amounts and we commonly find addicts who can accommodate with a sort of impunity doses of narcotic that would kill a dozen normal persons. Gradually the habit grows from a mild whetting of the hungry appetite of a few body cells into a voracious, consuming, destroying influence that sinuously draws into its death embrace every cell in its victim's mechanism. The respectable citizen

thus becomes a menace to his community, a shame to his companions, and a digger of graves for himself and his family.

Another converse idiosyncrasy is the alcohol habit. Here, as in the dope habit, we find with emphasis the close interweaving of psychology and physiology—of habit and pathology. Here, perhaps, more vividly than elsewhere, we find the desire for the forbidden, the lust for the lost, finally appreciated and satisfied—only to turn about and grasp its victim in a cold, relentless grip.

Physiologically, however, alcohol is not nearly the menace that the narcotic evil is, but it is the psychologic blunders of prohibition and temperance advocates that have keened and multiplied its dangers. But this is no preachment for or impeachment of prohibition. Suffice it to state that the very choice of the word prohibition is a psychological calamity—for it is natural to want anything that is prohibited—and there are no idiosyncrasies or exceptions to this very human habit. It is this psychology plus the physiology of alcohol that makes the problem of its conquest so remote.

Someone asked me today if animals other than man exhibited idiosyncrasies. That is a difficult question to answer. But it offers avenues for interesting speculations. Think of a cow with hay fever. One might paraphrase Oliver Herford's purple cow to this extent,

I've never seen a sneezing cow—
I never hope to see one;
But this I *know*—if this is so—
I'd rather see than be *one*.

There are those in the audience, perhaps, who are wondering just when I am going to sneeze. So far in the treatise there has not even been a vestige of a sneeze. And at last we approach it with fear and trepidation, knowing that it constitutes evidence of an idiosyncrasy of much importance to a great and highly specialized group of sensitive Americans. I refer to hay fever.

There are those to whom this twin word brings a reminiscent smile, perhaps a giggle or even a raucous laugh, for it is one of those peculiar words in our heterogeneous language that for some reason or another is only cause for mirth. One of those joy-provoking words or phrases like "whiskers" or "mother-in-law" or "brown derbies" or "bananas," that for no real reason in the world excite our laughabilities and stimulate our sense of humor. But there are those for whom the words hay fever have only the vehem-

ence born of long suffering—and these ill-fortuned sons of man can but unite in one ascending adenoidal roar, as from their blocked and tortured bronchial maze they pour their maledictions upon those pervert humorists who find their precious fever funny.

An occasional sneeze may be excusably ridiculed and laughed at—but when as in hay fever, paroxysm after paroxysm reduces the victim to a state of nervous exhaustion not unlike that of a heart-broken child whose tear duct has been completely drained—then sneezing becomes a veritable tragedy and not a fitful comedy.

And pray, asks someone, what is a sneeze? The dictionary prosaically states that the verb sneeze means to emit a sudden and violent rush of air through the mouth and nostrils, audibly and convulsively—and this, I take it, is a good enough description of the sneeze. It does not, however, explain the purpose of the paroxysm, which in brief seems mainly to be an effort of the body to expel foreign irritants from the nasal cavities. Sneezing is a reflex act, and as such is beyond the control of the will. Often, however, it may be prevented by a strong stimulus to the nasal nerve, such as pressing it at the base of the nose.

Now sneezing may come from a multitude of things, such as chemical or physical irritants. Often the mucous membrane of the nose is so aggravated or sensitized that it sends in an order for a sneeze at the slightest provocation. Sneezing is often before and after a cold—it seems to welcome the coming and speed the going guest. One pun has it that "A sneezing mortal flirts with eternity"—and surely enough so does a thinking or a breathing mortal, for as Longfellow says:

> "Our hearts though sound and brave,
> Still like muffled drums are beating
> Funeral marches to the grave."

But the sneeze that interests us most this evening is the sneeze of the hay-fever victim.

There is no disease within our ken that seems to fit best into the make-up of the hurrying, scurrying, temperamental Yankee than does this periodic hay fever, so named because hay was once considered as responsible for it. But do not believe the hoax-hucksters that tell you that it is distinctly an American disease. It is universal. Its oddness rests not only in its recurrent visitations but also because it causes its victim as much misery as any non-fatal disease

that has ever afflicted mankind, and yet year in year out, with a complacency that is mysterious and awe-inspiring to the outsider, the hay feverite, who for the nonce was racked and torn, comes back at the season's close strong, smiling and apparently uninjured.

Into the forgetfulness of the past he nonchalantly casts the season's last experience and with a dignity that passeth all understanding he awaits the inevitable return of his own particular brand of curse. There is another oddity to the hay feverite and that is his exclusiveness. He belongs to a select crowd, an inbred community whose charter and covenant brook no rank outsiders. Then also he possesses certain elements of fashion for those who seek admission to his lodge must come with good credentials. Frequently certain sensitive persons acquire a running cold, a peculiar acrid hygroscopicity of the nasal mucosa and they proudly acclaim themselves as candidates for the ancient and honorable order of sneezers. Others at odd intervals, through infection or irritation, deliquesce rather copiously from their ocular depressions, their eyes are filled with sabulous itchy dust, and their nostrils exude a sympathetic effluvium. Hay fever—they joyously cry—hoping to qualify without any unnecessary suffering, into the galiant old order.

But the honest-to-goodness hay feverite views these newer interlopers with unattenuated scorn, and bids them off his premises. He knows that a summer cold or a fleeting coryza is nothing like hay fever. He knows that each recurring year, upon his own red letter date, there comes the vicious caller. Regular as the income tax it appears and only goes away when winter comes to curb its mean tormentings. And every season it performs the same old tiresome drama. Never a novelty to ease the tedium of its dreary stay. Never an intermission between its humdrum acts. Day in, day out, it trails its hapless victim nor leaves him peaceful with the night.

"For his nights are filled with anguish;
As his days are filled with tears,
And his loud stentorian sneezes
Rip the drums inside his ears."

Credulous and ever searching for relief the victim of hay fever is doubly victimized by quacks and charlatans who prey upon his wearied system. Everything new that comes along in the way of a patent medicine he eagerly patronizes, only to return again and again to his former state of resigned indifference. The scriptural classic

of human patience may have been worthy of its day and place and generation, but if there was no ragweed and hay fever in Israel, Job's patience was certainly not properly and thoroughly tested.

Hay fever seizes its victims at divers seasons of the year, depending upon the sensitiveness of the patient to seasonable impressions. It is really due, as we shall see later, to an idiosyncrasy or perhaps a whole parcel of idiosyncrasies. The outer departments of the respiratory organs, such as the nasal passages and parts of the bronchial tract, are naturally coated with a peculiar impressionable lining known as the mucous membrane. This membrane has a diversity of occupations and responsibilities. It is one of the gatekeepers that guard the sacred citadel against invasion. When properly functioning and its integrity is unimpaired, it constitutes a barrier that keeps away all vicious influences, a sort of a fluid moat that guards the castle gates. Its humid surface drowns or stupefies the germs or foreign grains that come to rest upon its damp exterior. But in certain persons, namely, those who cultivate hay fever or similar protein idiosyncrasies, there is a hypersensitiveness of this mucous tissue to some peculiar irritant, cause or object, that would be inactive and inert in the case of one immune to the poison. There is in the sensitive victim an inability to consume or destroy certain foreign particles that aviate about and finally deposit their wares upon his mucous landing-place. Of course it is agreed that hay fever and concomitant conditions are not localized to the nasal mucosa—for eventually the disease becomes systemic. It is the blood stream that finally becomes the area of excitation.

In the true hay fever victim the excitation is accomplished by the pollen of certain plants. The physical form of the pollen is not responsible for the excitation, rather it is their chemical constitution that accounts for their misdeeds. Certain principles of nitrogenous comradeship, known as toxalbumins, for want of a better name, are present in plant pollen and it is these highly complex chemical compounds getting into the circulation that cause all the troubles of the poor hay-fever sufferer. That the pollen is responsible for hay fever has long been known, hence the term pollinosis now used to describe the mean, mean malady in exclusive circles.

The antiquity of the disease and the universality of it is recorded by an Italian medical writer who, as early as the sixteenth century reported patients with headaches, itchy noses and flooding eyes, taken with periodic sneezing fits. And one need not stretch

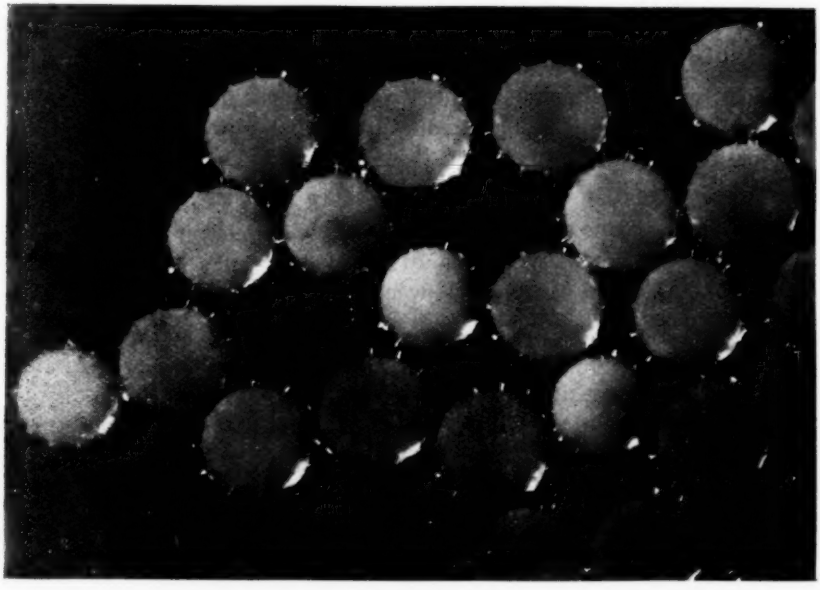
his faculties very tensely to imagine the dilemma of that institution of chivalry of King Arthur's days—the brave knight always looking for trouble—who becomes a victim of rose cold or hay fever. Think of the tumult and clamor of that peripatetic scrap and old iron when his armor clanged and clattered as he sneezed in queer convulsions.

But not until the nineteenth century was hay fever recognized as a clinical entity. John Bostock, an English physician, refers to a peculiar disease that came periodically to swains and damsels of the countryside, whereby, says he, they have a sense of warmth and fullness in their eyes, itching and burning and smarting, and a distaste for light. Their noses are inflamed and blossom out in scarlet splendor. At uncertain intervals, he continues, they sneeze with loud explosions and waste themselves in useless efforts to maintain their breathing space. He further incorrectly attributed the disease to the aroma of flowering grasses. Then came others who, by experiment, proved beyond doubt that pollen and pollen alone was responsible for the hectic affliction.

Another English physician who was himself subject to pollinosis, experimented upon his own person with the pollen from dozens of plant sources. He inhaled it, rubbed it into his nostrils and upon his inner eyelids. He made pills and potions and plasmas out of it, swallowed it and applied it to scarified areas upon his arms and legs. In short, he tried it upon himself in every possible way. His conclusions were that pollens caused symptoms of hay fever and that the pollens of the grasses were chiefly to blame. He later proved the prevalence of pollen granules in the English air and showed with clarity that flowering plants begin to broadcast their pollen in the early spring. By midsummer the atmosphere is surcharged with these little granules and until the cold of winter numbs and chills the plants' pollinating activities, the air still carries these pernicious particles, pernicious however, only to sensitive persons.

Dunbar later proved that it was the protein or nitrogenous portion and not the starchy portion of the pollen grain that caused the toxic symptoms. Incidentally this pollen that the flowering plant so generously disseminates is part of the regenerative device of the vegetable kingdom. Despite the fact that flowers may exhibit dual sex, the reproductive and fertilizing propensities are not conducted intrapetally. As a rule the pollen of one plant requires transmission through some agency or another (and nature sees to the pro-

viding of this agency), to a comrade plant of the same species located perhaps at close range or sometimes at tremendous distances. The presence of pollen in the air therefore is an effort of nature to perpetuate her chlorophyllic children. Pollen granules floating in the summer breeze carry messages of love from one sweet flower to another. And the breeze is not their only express wagon, although it is the most responsible insofar as the hay-fever sufferer is concerned.



**POLLEN OF ROSE OF SHARON, Hibiscus syracus.**
**A Harmless Pollen. Magnification, Approximately 400 Diameters.**

For by sundry and various ingenious devices bees and butterflies and other buggy beasts of burden, are inveigled and prevailed upon to lend their persons to the conduct of these dainty creeds of blossom loves from one sweet creature to another. Those of us who know the blessings of youth spent close to nature will remember the bees with yellow leggings that wheeled their droning flight through summer air, their rear axle smeared with the sticky pollen. Each flower they searched for honeyed treasures requested in return a passage for their golden seed germs, and many the poor passenger bee that fell in the creek a victim to poor judgment in the

matter of his freight capacity. But the ways of nature are devious and odd, and the pollen that drowned the bee express is borne by the rushing waters elsewhere to fertilize its kind or start a brand-new hybrid.

Only the pollen cast by the wind is a menace to human intolerants. This scourge is limited to the pollen that is light and airy, that is dusty and easily borne by the breeze. Pollen that is sticky and increases its weight by clumping and grouping, is not a menace for by agglutinating it becomes too heavy to be air-borne. Thus sticky insect-borne pollen comes only from the large attractive flower, the odorous blossoms, for the bee is an esthetic bug and will not visit an inconspicuous plant. Nature, then, has granted to the modest inconspicuous blooms gentle breezes wherewith to effect their pollination.

Thus it is that we find that hay fever is largely caused not by the pollen of large and showy flowers, such as the daisy, aster or dahlia, but by the dusty pollen of small and unnoticeable inflorescence, like the grasses and the weeds. The thoughtless poet calls these weeds—

> "Dear common flowers that grow beside the way,
> Fringing the dusty road with harmless gold."

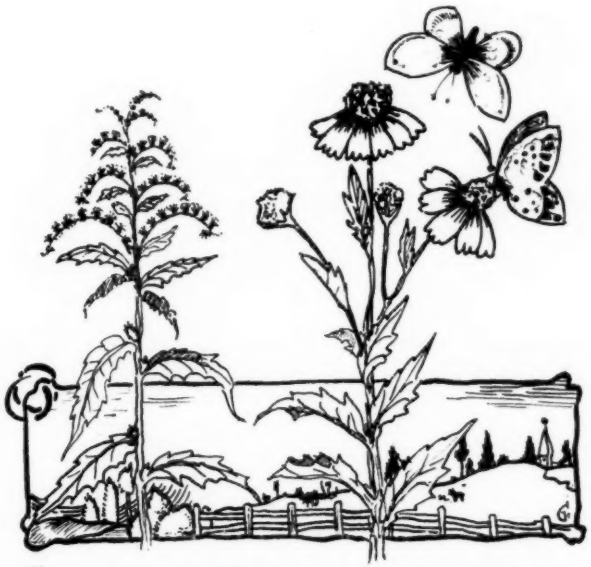
Furthermore one may generally fix the identity of a culprit plant by noting along with the smallness of its inflorescence the diversity of its individual blooms. For again nature shows ingenuity in insuring the perpetuation of the flowered race by affording enough blossoms to provide pollen in enormous amounts, so that there will be no question of the survival of the species. Nature knows that the wind is not nearly as reliable as the bug express and in order to be certain that the wind-borne messages get to their destination she wisely sends thousands abroad hoping that one, at least, will get to its journey's end.

The plants responsible for hay fever, therefore, are those that bloom in innumerable small and inconspicuous florets; and surely enough the grasses with their hidden blossoms, useless ragweed and other kindred weeds, are the chief and consistent offenders.

Hay fever of the late spring and early summer is often erroneously designated "rose cold" or "rose fever." Such a name is a misnomer, for rose cold is hardly ever caused by rose pollen but by

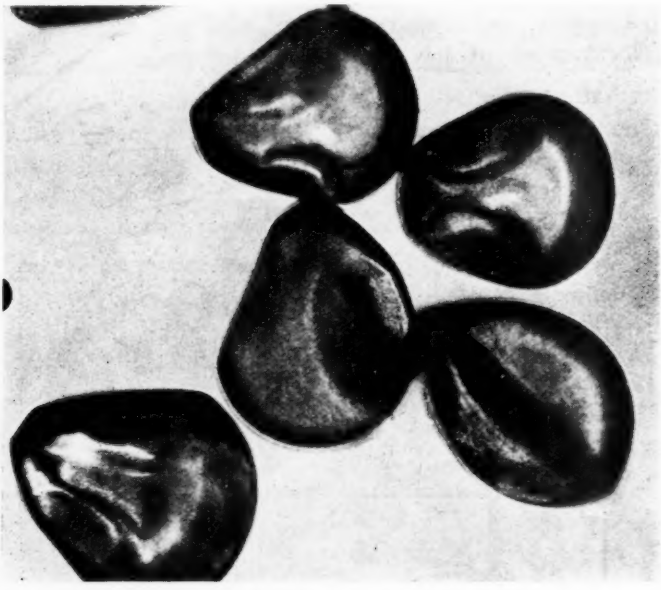
pollen from the grasses. In like manner, fall hay fever is popularly attributed to pollen of the goldenrod, while in reality it is caused in the vast majority of cases by ragweed.

The pollen of corn, in spite of its toxicity, is rarely responsible for hay fever; because its size is so great that it cannot travel far; so that only by close proximity to a corn field can hay fever be induced. Rye and wheat also have large pollen grains and, therefore, are of little practical importance as a cause of hay fever. The cereals, however, including rye, wheat, oats and corn, may constitute a local cause of hay fever in some states.


NOT THE LARGE-FLOWERED INSECT
POLLINATED PLANT — BUT RATHER
THE SMALL-FLOWERED WIND . . .
POLLINATED WEEDS AND GRASSES-THAT
CAUSE · HAY-FEVER .

The pollens of the coniferous trees and the grasses, especially timothy hay and sweet vernal, are generally the causes of spring affections; the summer grasses, and certain garden flowers and summer flowery weeds cause the midsummer madness, and last, but not least, the vicious late summer ragweeds that are the worst of-

fenders in every clime and region. These good-for-nothing weeds* flourish everywhere, working their evil ways in all directions. Fertile, hardy and useless, they rapidly crowd out less virile plants and promptly change a vacant unused spot into a rank and jumbled jungle. In the East it is between the grasses and the ragweeds that lies the grave responsibility of making countless millions miserable and morose.



**POLLEN OF CORN, Zea mays.**

**Magnification, Approximately 400 Diameters. (Note Similarity to Grains of Corn.)**

We cannot be too harsh with the grasses, however, for they are useful. Someone has called them the overseers of the soil, that bind it to its duty. Were it not for them the soil of hill and plain would emigrate like desert sand and every rainstorm would move a continent to sea. Where grass is master, soil will serve mankind.

*One listener objected to the description of the ragweed as useless pointing out that it furnished certain wild animals with fodder and also because it furnished the antidote for ragweed pollinosis. In the latter instance one might say with equal eccentricity that the veriform appendix shall not be termed useless insofar as it furnishes the surgeon with a great many operations.

And then again we owe our daily diet to a kind of grass—the wheat, the corn or rye. But the ragweed is only a pariah in nature's scheme of empire. Good for nothing—vagrant, selfish and vicious, it stands by itself as a nuisance.

On the wing of a breeze, then, the pollen finds its way to the nose of man. Only the sensitive, however, react to its presence and some can with impunity even snuff its very substance into their nasal passages. But the victim of pollinosis reacts to it at once. As soon as it lands on the membrane the itchy news is quickly broadcast to headquarters and an order is despatched for a sneeze. The mucous surface knows at once its inability to cope with its vicious visitor, and it seeks to dislodge the intruders by asking the cellular neighbors to co-operate in a series of sneezes. Sneeze after sneeze—but the pollen still hangs on and sends its poisoned shafts in all directions through the tissues. The nostrils alternate in closing up, the head stuffs up with pressure from within and eyes seep out their copious emanations. The attack spreads and involves the bronchial and laryngeal tracts, the voice grows thick and echoing and then a midnight cough appears. Itching nose and swollen palate, labored breathing and a hunger for pure air all are symptoms of the attack of the little pollen granules on the sensitive individual, and the attack persists in all its intensity as long as there is pollen in the air.

But at last winter comes, and robs the pollen of its sting—and the poor hay feverite, still not any the worse for wear—looks forward to the coming year supinely hoping that the next attack will be a little lighter than usual.

The hay fever season varies in different sections of our country, depending, of course,, upon climatic conditions which govern the flowering periods of the various hay-fever plants. As a point of interest the following table illustrates these seasonal variations and the pollens of primary importance. (This is incidentally suggested for the hay-fever tourist's blue book.)

NEW ENGLAND STATES.
(Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut.)

EASTERN STATES.
(New York, New Jersey, Pennsylvania, Delaware, Maryland, the Virginias.)

CENTRAL STATES.

(Kentucky, Ohio, Indiana, Michigan, Illinois, Wisconsin.)

| *Name.* | *Time of Bloom.* (Hay-fever Season.) |
|---|---|
| Timothy (Phleum pratense), | June to August |
| Ragweed (Ambrosia elatior), | August to October |

SOUTHERN STATES.

(North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee, Arkansas, Louisiana, Oklahoma, Texas.)

| *Name.* | *Time of Bloom.* (Hay-fever Season.) |
|---|---|
| Bermuda grass (Capriola dactylon), | May to September |
| Timothy (Phleum pratense), | June to August |
| Johnson Grass (Sorghum halepense), | June to October |
| Ragweed (Ambrosia elatior), | August to October |

MIDDLE WESTERN STATES.

(Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas.)

ROCKY MOUNTAIN STATES.

(Montana, Wyoming, Colorado, Utah, Idaho.)

| *Name.* | *Time of Bloom.* (Hay-fever Season.) |
|---|---|
| Sweet vernal Grass (Anthoxanthum odoratum), | April to July |
| June Grass (Blue Grass, Poa pratensis), | May to September |
| Timothy (Phleum pratense), | June to August |
| Sage Brush (Artemisia tridentata), | July to September |
| Ragweed (Ambrosia elatior), | August to October |
| Russian thistle (Salsola pestifer), | July to September |

SOUTHWESTERN STATES.

(Southwestern Texas, New Mexico, Arizona, Southeastern California.)

| *Name.* | *Time of Bloom.* (Hay-fever Season.) |
|---|---|
| Cottonwood (Populus macdougali), | February to April |
| Shad scale (Atriplex canescens), | March to June |
| Rabbit bush (Franseria deltoidea), | April to May |
| June Grass, Blue Grass (Poa pratensis), | May to September |
| Bermuda Grass (Capriola dactylon), | May to September |
| Johnson Grass (Sorghum halepense), | June to October |
| Annual Saltbush (Atriplex wrightii), | July to September |
| Russian Thistle (Salsola pestifer), | July to September |
| Sage Brush (Artemesia tridentata), | July to September |
| Careless weed (Amaranthus palmeri), | July to October |
| Slender Ragweed (Franseria tenuifolia), | September to October |

PACIFIC STATES.

(Nevada, California, Oregon, Washington.)

| *Name.* | *Time of Bloom.* (Hay-fever Season.) |
|---|---|
| *Black Walnut* (Zuglans nigra), | March to May |

(In California, this is much grown as a shade and ornamental tree in the Sacramento, Napa and Russian River valleys, where it is the most frequent cause of spring hay fever.)

*Orchard Grass* (Dactylis glomerata), April to August

(Apparently orchard grass is one of the most active of grass pollens occurring throughout the State of California, especially in meadows and pastures of the north, and extending through Oregon and Washington.)

*Perennial Rye Grass* (Lolium perenne), May to July

(This grass is most important from San Francisco northward, and in Oregon.)

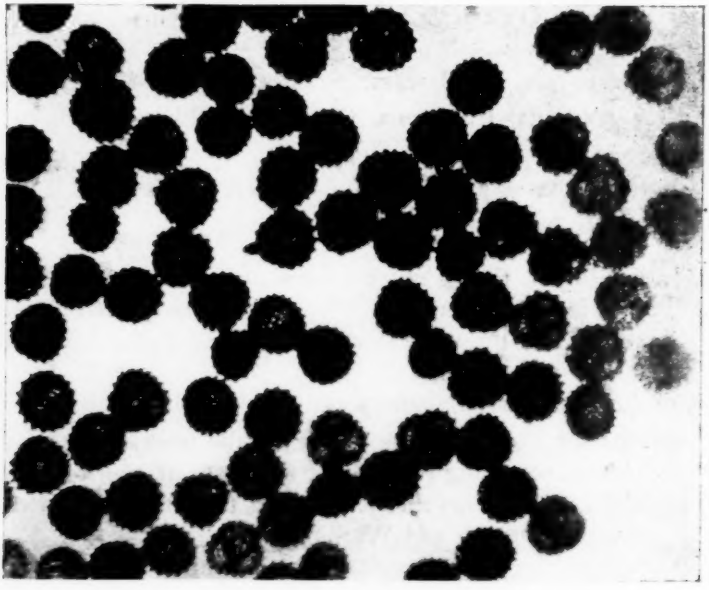
| | |
|---|---|
| June Grass, Blue Grass (Poa pratensis), | May to September |
| Bermuda Grass (Capriola dactylon), | May to September |
| Timothy (Phleum pratense), | June to August |

(This is a very important cause of hay fever in the northern and mountain countries of California and in Oregon and Washington.)

| | |
|---|---|
| Redtop (Agrostis palustris), | June to September |
| Johnson Grass (Sorghum halepense), | June to October |
| Russian Thistle (Salsola pestifer), | July to September |
| Redroot Pigweed (Amaranthus retroflexus), | July to September |
| Sage Brush (Artemisia tridentata), | July to September |
| Mugwort (Artemisia vulgaris), | July to October |

(In California, the mugwort is the most frequent cause of the fall type of hay fever).

(These tables are compiled from a bulletin issued by the Lederle Laboratories.)

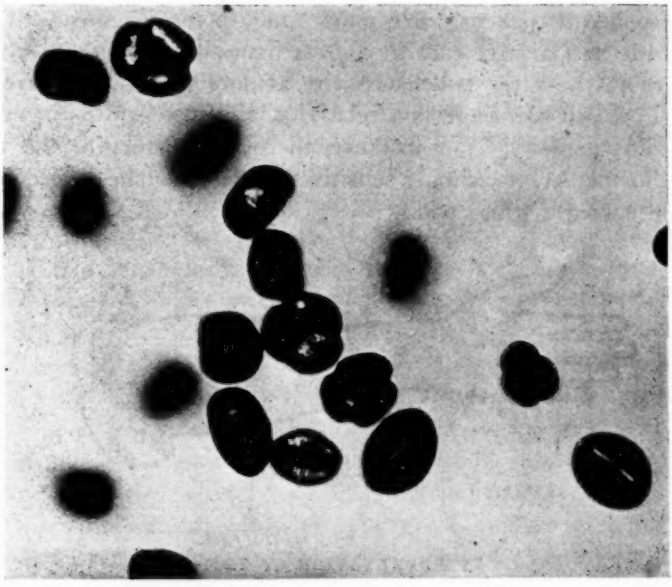


**POLLEN OF GIANT RAGWEED, Ambrosia trifida.**

**Magnification, Approximately 400 Diameters. The Pollen of the Low Ragweed (Elatior) Differs Only in Size.**

Methods for relieving this dread malady have occupied the attention of the medical profession for many decades, and it has become bromidic to remark, "If anyone could invent a cure for hay fever he would certainly make his fortune." But if we believe the times cure, or at least relief, has come.

Of course it was long known that a sojourn in a part of the country where the offending pollen is not in the air, often alleviates the fever. But not all members of the sneezing fraternity can afford to leave their indigenous habitations and emigrate to new surroundings for a large fraction of each year. Then again, high elevations are said to lessen the menace. If this were actually so, a healthy part of our communities would probably migrate to a mountain top or hire a hall in a skyscraper during the pollinating season. This is not practicable and probably not necessary. For now, by means of the remedy known as the immunization pollen treatment, which

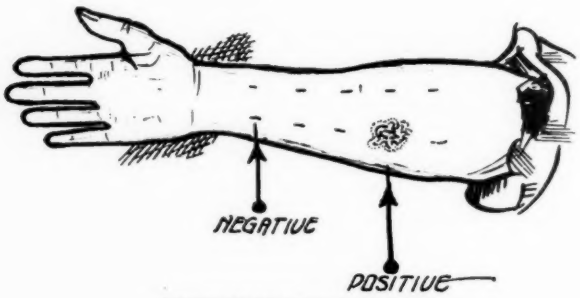


**POLLEN OF WORMWOOD, Artemisia vulgaris.**
**Magnification, Approximately 400 Diameters.**

is of comparatively recent exploitation, it is possible to effect a cure in some instances, and a lessening of the symptoms in a larger majority of cases. This treatment was conceived by recent medical experimenters and while new in application is not at all novel in concept. A thousand years ago the doctrine of signatures was in vogue. This conceived of the infantile idea—and it existed when our civilization was an infant—that a round drug would cure a round boil—that a dark brown drug would correct a dark brown taste; that a

stewed hare would cure baldness, etc. Hahnemann later resurrected the old doctrine, camouflaged it with a little erudition—called it by the official Latin title—*Similia similibus curantur*—and sold it under the synonym of homœopathy. Then along came the more recent adaptation of the old empiric theory to vaccines, and other immunologic agents. Under its ministration we attempt to cure pneumonia with pneumococci; smallpox with the cowpox virus, and anthrax with the anthrax germ. And so we do with hay fever. We treat it with the pollen or pollens responsible for its causation.

But here, as elsewhere, "If we want rabbit pie we must first catch the rabbit." So to cure the pollen fever we must catch the culprit pollen or pollens. We must establish the diagnosis. This is done with comparative ease in a great many cases. Others who are sensitive to the rarer pollens require a more painstaking investigation. For, you see, there is a relativity, as Einstein calls it, even to these idiosyncrasies. For instance, there is the story of the young man who was so exceedingly sensitive to grass that he sneezed every time he passed a grass widow.




**INTERPRETATION OF TEST.**

Before one can catch the culprit pollen it is necessary, of course, to catch the patient. Having manouvered this with skill, the next step is to scratch the patient's forearm upon the under side, in several places. This is done with a scarifying instrument and the skillful operator can do so without drawing blood and without hurting the patient or himself. To each scratch, according to a certain prearranged order, there is added a drop of the extract of the various indigenous or local pollens—one variety, of course, to each scratch. The patient will quickly show a local reaction to the pollen to which he is sensitive. An urticarial weal develops around the

site of the scarification, swelling up with great conceit and often accompanied by a distinct itch. It may develop that the patient is sensitive to a number of pollens, perhaps only to one, and the fewer and less intense the reaction the better chance there is of good results in treatment.

Treatment is instituted generally two or three months before the initial seasonal attack. It consists of administration to the patient by hypodermic injections, of a series of graded doses of the toxalbumins prepared from the pollen or pollens to which the patient displayed sensitiveness. There is a special unit basis of treatment generally conducted which starts the immunization with a very small dose and gradually increases it to a considerable or maximum dose, thus gradually increasing the patient's tolerance. Treatment varies, with the patient, depending upon the latter's reaction, and continues up to the ordinary date of attack, when it is considered good policy to stop. Some authorities, however, claim that it is wise to maintain treatment during the early attacks of the first season. It is necessary to repeat the treatment annually for the protection afforded is basically transitory. There are people who say that this remedy is worse than the hay fever—that sneezing is a great deal more satisfactory and much more economical than being stuck in the arm with a needle every so often, the intensity of the stick varying according to the seasonal disposition of the sticker and the antiquity of the needle. But the hay feverite who has had good results never says this. He is usually so thankful that he even pays his doctor's bill, promptly and in full.

And now we come to the concluding idiosyncrasy, namely, that which is unknowingly exhibited by a great number of people who suffer from what is known as asthma. Not all cases of asthma are of this type, of course. Reference is only made to the so-called allergic or protein asthmas. The dreaded symptoms of asthma, a disease rarely fatal but always hideously and distortingly painful to its victim, are only too well known to attempt describing here. Sufficient to state that the disease, like other evil influences, often "flies by night." The sufferer in its cruel grasp is seized at a time when slumber should be his portion. He is generally awakened from a sleep, his breathing labored and difficult. The effort to fill the lungs and expand the diaphragm is very urgent but not at all productive. The victim often struggles for his breath for long and lonely hours. The night is made more hideous by the never

ceasing pain. The spasm may continue till the dawn and then subsides, often leaving the patient weak and nervous for the rest of the day. And these terrible attacks recur frequently.

Such asthmas are often caused by the undue sensitiveness of the victim to a foreign protein which has surreptitiously come into the body ramparts, and has by its mere disgusting presence upset the tenor of the rest of the body's cellular population. This foreign protein may be inhaled and absorbed through the mucosa or it may be carried into the stomach, as is the case with the food proteins. In the latter instance even the digestive functions of the gastric region do not seem to neutralize or break down the vicious protein. It is a well-known fact that if we introduce directly into the blood stream of a normal and healthy animal, a small portion of white of egg (which is a simple protein) that animal will immediately show rebellious reactions (known as anaphylactic shock) that may become so uncontrollable as to cause the death of the animal. Medical history is not without notable records of such mishaps with human subjects. Pituitrin, horse serum and similar nitrogenous bodies have been known to kill patients who were antipathic to these bodies and who had not been tested beforehand to assure their reaction.

So it is with persons exhibiting these asthmatic reactions. Frequently the sensitive body may show its chagrin in another way. It may develop a "rash" or urticaria or dermatitis. Diagnosis and treatment of these antipathies are conducted exactly as with hay fever.

The causative factors in these asthmas, skin eruptions and irritations, belong to several groups—vegetable and animal in origin. Among the animal proteins responsible may be mentioned the following agents:

Animal fur, such as cat fur, dog fur, rabbit fur;
Animal dandruff,* horse dandruff, stable dust, etc.
Feathers, from chicken, goose, etc.;
Meat proteins, pork, veal, etc.;
Dust, which contains a conglomeration of things.

Those of vegetable origin are numerous, the cereal proteins, fruit proteins, edible nut proteins, etc.

*It might be interesting to note at this point that human dandruff seems to show an uniformly positive reaction when applied to human beings. This fact may explain certain excemas and skin disturbances that often accompany dandruff shedding.

Then there are the bacterial proteins which often cause more trouble than is generally known. A few interesting cases of authentic record may be given as our final offering.

Case No. 1. A young boy who was a victim of a violent bronchial asthma, and who displayed skin reactions when tested against feathers and egg proteins.

This boy's physician ordered complete extinction from the boy's diet of all fowl-meat and eggs. He was not allowed to sleep on a feather bed or rest upon feather pillows. He was further treated with the protein desensitizing solutions over a three months period. The results were completely gratifying. No chicken—no asthma.

Case No. 2. (From medical literature):

One asthmatic is stated to be so sensitive to egg protein and hen meat that he can eat rooster meat and probably eggs from the same source, with impunity, but hen meat or eggs bring back his malady.

Case No. 3. (From newspaper source):

Mrs. Jones was suing the taxidermist for having sold her an improperly dyed fur coat which caused an unusual skin eruption around the neck and wrists every time the coat was worn. It was argued by the prosecution that the coat was colored with a poisonous coal tar dye and the dye not properly mordanted or fixed. This leached dye was considered responsible for the skin eruption and general systemic reaction. The taxidermist, however, was able to prove, with the assistance of a physiologic chemist, that the dye was non-poisonous, was properly mordanted and that the reaction was caused by an idiosyncrasy which the wearer exhibited to the squirrel fur of which the coat was constructed. This was very conclusively proven—and to the satisfaction of the Court, by taking a piece of cured squirrel fur and fastening it to the upper arm of the plaintiff, whereupon appeared in due time the typical urticarial rash.

The cuts of pollen granules are generously loaned by the H. K. Mulford Company of Philadelphia.

# PLANT SCIENCE LABORATORY SEMINAR.*

**(Botany—Pharmacognosy—Plant Chemistry—Pharmacology.)**

**By E. L. Newcomb.**

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## V.

## PHARMACOGNOSY RESEARCH AND TEACHING PROBLEMS.

**The Feature of the Ninth Session Held Wednesday Evening, Was an Address by Dr. Henry Kraemer, Which Was Read by E. L. Newcomb.**

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## THE FUTURE OF PHARMACOGNOSY.

**By Dr. Henry Kraemer.**

A seminar such as projected during the coming week augurs well for pharmacy. During my earlier years all of my summers were spent at the Marine Biological Laboratory at Wood's Hole, Massachusetts. There were gathered under the leadership of the eminent zoologist, Dr. Whitman, the investigators in biology. The idea had its inception from Louis Agassiz who conducted much of his research work at Penikese, one of the islands in Buzzards Bay. Here with a band of devoted students he developed the scientific spirit among American biologists, the fruits of which we see in the Smithsonian Institute, the American Museum of Natural History, the Field Columbian Museum, and many of our academies of science and universities.

These summers were full of inspiration, as here were the plants and the animals living in the Sound and in the aquaria in the laboratories. Students were busy collecting with their nets and traversing the water in their high rubber boots. The investigators were there to tell night audiences of what they had accomplished. There were lectures and colloquiums where the dross was separated from the golden floss and a newer con-

*Held at the University of Minnesota, Minneapolis, Minn., August 20-25, 1923.

†This concludes the report given in the February issue.

ception of life and its meaning was brought out. At that time I longed for the time when something might be done to further the interests in Pharmacognosy in this country and make it possible for us to have a spirit of fellowship and an opportunity for the exchange of experiences, just as we have here during this week.

Pharmacognosy is one of the most attractive of sciences. It touches living things on one hand and its problems are the riddles of the whole drug world. The work of the pharmacognocists is at the basis of the administration of medicines. Human life ultimately depends in a very large measure on the standards and purity of drugs, which we establish.

Let us hope that much good will come from this seminar. I am not only thinking of the benefits to ourselves in this work, but to the apprentice in pharmacy. It is unfortunate that throughout the years that are past, few men have been in training in pharmacognosy where the service now demands many. They are needed as teachers and by the manufacturing laboratories. In fact the opportunities for the men who can perform the exceptional tasks in pharmacognosy, are unusually bright. The world is changing and the captains of industry are looking for men who can detect the defects in established practices and who have the activity and understanding to find a way to improve methods and are willing to consider new ways and means of doing the old things.

Mankind will always need medicines to tide over some of those impaired conditions of health and restore the system as rapidly as possible to the normal conditions of health. If there is a tendency of the times for people to use less medicines, or even a disposition upon part of certain groups of people to eliminate them entirely, I believe that this is in a large part due to the fact that there is a too prevalent incompetence on the part of the manufacturers generally to appreciate that relatively few of our drugs have been sufficiently investigated and that we do not have the necessary standards for determining quantitatively their quality.

Furthermore, if there is a disposition on the part of the medical men to limit the materia medica to what are called useful drugs, this is in large part due to the fact that the

drugs classed as useless are those which when purchased upon the market are found to be almost totally inert and deficient in those constituents to which their therapeutic action had been ascribed. To the careful student of vegetable drugs it is almost incomprehensible that so many of our valuable drugs are used so little and that the physicians do not give necessary attention to them.

There have been several reasons for the slowness of the development of Pharmacognosy in this country. The chief reason probably has been because we have placed too much dependence on experience and not sufficient on education. The mountaineer and bear-trapper has been considered more of an expert in identifying drugs than the graduates of our colleges. He is looked upon as an authority by the crude drug dealers and manufacturers and his word is unquestioned. On the other hand there has been a general lack of professional standards in the colleges of pharmacy. This latter defect is really very serious and can only be overcome in one way. If students have caught the spirit of enthusiasm for making a career in Pharmacognosy they should in a whole-hearted and unselfish way be encouraged to get the most liberal education in one of our universities.

A broad training in botany, especially taxonomic botany, is very important. Field work in general botany with the keying down of plants is absolutely essential. This practice cannot be overemphasized. The training in this kind of work and the contact with floras will give a man a grip on the identification of drugs and enable him to distinguish between them more readily than any other training which can be given him. Instead of giving him a make-shift course in the department of pharmacy he should be directed to take a thorough scientific course, spending much of his time with the professor of systematic botany.

Chemistry is another fundamental science in which the pharmacognocist should be thoroughly trained. In fact he cannot spend too much time in chemistry. The more work he does in organic chemistry, the better qualified he is to appreciate the nature of the chemical constituents in drugs and deter-

mine ultimately the fine points of variation and the essentials to establishing uniformity in standards.

To some it may seem that the field of pharmacognosy is a very limited one and that the work is largely a mastery of scientific terms and miscroscopic measurements. It may not seem to require much intellectual effort and call for much originality. It may not seem as though there are great problems to be solved and a very keen insight required in the solution of the many everyday problems. Let me illustrate by calling attention to the work on pumpkin seeds which ought to be undertaken.

Pumpkin seeds have been largely used by the laity as an anthelmintic. The bruised seeds mixed with water are taken in their entirety. About ten years ago Dr. Power made a chemical examination of pumpkin seeds and failed to find in them any principle possessing anthelmintic properties. On the strength of this work it would be naturally grouped among the useless drugs. On the other hand, Dr. Sollman in connection with his work in testing drugs on the earthworm, has found that it is a very efficient anthelmintic. Pepo is now admitted into the Pharmacopœia, and while to some it may seem that we have a standard in the purity rubric and description, yet as a matter of fact we have not a whit of knowledge and its inclusion is solely on the basis of empiricism and without any scientific warrant. There are thousands of varieties of pumpkin seeds, all of which should be studied in a very thorough manner. The botany and pharmacognosy should be first established and years of research will be required to clear up our knowledge of this simple drug. I can see a most interesting future for any young pharmacognocist who would devote his attention to this one drug which has baffled medical science and which to my mind is one of the most puzzling of drugs. I doubt not but that it may open an entirely new field in the use of anthelmintics and that it is worthwhile is shown by the fact that a relatively large number of people are effected with intestinal parasites of one kind or another.

Probably no class of drugs has suffered so much from substitution and lack of attention to certain scientific methods of preparation as the anthelmintics. The history of the substi-

tution of spigelia, East Tennessee pink root, is too well known to all of you for me to enlarge upon it at this time. The substitution of the staminate flowers of cusso for the official pistillate flower has caused this drug to be dropped from the Pharmacopœia. On account of the unscientific preparation of the flowers of santonica this drug has long been replaced by santonin, when as a matter of fact other constituents of this drug are of great importance and an ideal preparation would represent a combination of the constituents of the unexpanded and quickly dried flower heads. The study of aspidium is even more interesting. It is well known that the green stipes of this drug are particularly rich in anthelmintic constituents. For forty years the framers of the Pharmacopœia have included in the definition of aspidium one of our indigenous species, *Dryopteris marginalis,* but yet I doubt very much if this drug is ever collected. To my knowledge for some fifteen years, whenever the American drug has been attempted to be collected, the rhizome of an entirely different fern was taken, *viz.*, *Osmunda Claytonia.* Furthermore, until recently hardly any of the aspidium which has been sold in this country would yield an oleoresin that would make an efficient preparation of aspidium. What is even more interesting is that the active principle, filicic acid, is readily decomposed into its anhydride which is inactive, and its acid, the latter occurs in the drug to an extent varying from fifteen to thirty per cent. and yet may be very easily converted into its active product by merely dissolving it in alkalies and precipitating it out with acids. Surely when the anthelmintic drugs are so extensively used it would seem a most fertile field for some pharmacognocist who is looking for new fields to explore, and who is desirous of establishing a reputation for himself to seriously consider the possibilities of either a cursory, let alone an extended research.

The history of the use of astringent drugs in medicine is also one of very great interest to pharmacognocists. There has been a disposition upon the part of physicians to consider that one astringent is just as good as another and the result has been a wholesale dismissal of very many of our most interesting and valuable drugs of this class. Because catechu could be used in a more or less decomposed form, frequently having in it larger

forms of animal life as well as bacteria, it has been replaced by gambir. A careful examination of the constituents of catechu will show that gambir has none of the constituents of catechu. In the light of our knowledge we know that if catechu is previously heated to destroy its enzyme it will yield a preparation of tincture which will not gelatinize, catechu should be reinvestigated. It is also quite likely that our definition concerning catechu should be so changed as to insist that the drug represent a carefully dried extract and not one carelessly prepared as has been done for some years past.

In the same manner kino should be carefully investigated. The Malabar or East Indian kino is a very different product from Australian and the two should not be used interchangeably. But without even considering these fine extracts there are quite a number of astringent drugs to be derived from indigenous medicinal plants. The tannin of white oak bark is very peculiar and distinctive as is also the astringent principle of rubus. The fact of the matter is that the chemistry of these tannin containing drugs is more or less distinctive for certain classes. Not only do the acids give different reactions with iron salts, but some of them are combined in the form of glucosides while others are not. Furthermore, they are variously combined with other phenols and organic acids and nearly all of them under conditions of oxidation are changed into nearly insoluble and inactive compounds. Here is a most interesting and important class of drugs upon which it would seem really worthwhile for some pharmacognocist to devote his best energies in producing suitable and efficient preparations and combinations for the treatment of the various forms of diseases in which there is a relaxed action of the intestinal organs.

Suggestive illustrations could be continued indefinitely as to the problems which confront us. I prefer to leave this subject at this point so that each of you may contribute your share in the discussion which will follow the reading of this paper. Some onlookers at this meeting tonight may say that the problems which I have suggested are in part pharmacologic and that I have approached them from this viewpoint. If this be so, then I am glad for the opportunity to call the attention of my colleagues to the fact that one reason why we have not brought

more recruits into our ranks is that we have not brought out the medical and industrial uses for the substances with which we are dealing. The chemist always has a broad outlook and does not confine himself to symbols and reactions. In the same way the therapeutist will devote considerable attention to the history of drugs, in fact some of the best medical botanies have been published by medical authorities. This larger view and broader contact would keep us from getting too close to our subject and enable us to form the friendly associations with those who require our services.

The whole course of practical medicine is straining with neglected opportunities. The history of the therapeutic agents shows how with a good consitution in spite of a lack of knowledge of the proper remedial agents the human race can survive diseases and ignorance. The old Indian doctor, the farmer's wife, who made her decoction from the herbs which she gathered by main strength and awkwardness or natural instincts if you choose, arrived at a better understanding of the uses of medicines than we at the present time are able to develop. By employing fresh drugs or medicinal plants which were carefully conserved, results were obtained that seem incredible to the professional man of today. If there has been a spread of the doctrine of therapeutic nihilism it has been due to the fact that in our engaging in the large problems of the supply of medicines, we have entirely overlooked the drugs themselves.

The condition in pharmacy never looked brighter than at the present time. We have no patience with the pessimists who declare that it cannot rise to its possibility, nor with those who would restrict our activities. There never was a time when there were so many able men in the drug business as today. It would be indeed fortunate if some of the men who have succeeded in the drug business could direct their sons in acquiring a higher education and devote their lives specializing in certain branches of pharmacy which require a persistent and unflagging spirit of research. The master pharmacist it would seem should look ahead to the future status of pharmacy through ambitious spectacles and it ought to be his pride to foster the spirit of initiative and ideals in those who shall follow with the responsibilities of our craft.

The address by Dr. Kraemer was highly commended and followed by a general discussion of teaching problems and of the demonstrations and problems of the day, including a discussion on definitions, nomenclature and descriptions of federal and state food and drug standards, and on the need for an official color standard.

Dr. Viehoever discussed the great need for simple tests, may they be morphological, anatomical, chemical or physiological in pharmacognostical work. Extensive drawings of anatomical structures, if based on good sections and a clear understanding of the structural characteristics are very helpful in developing the power of observation. The main aim of pharmacognosy, Dr. Viehoever stated, should be to acquire knowledge of the drug for the purpose of its proper evaluation. It should be authentic, carefully collected, properly handled and contain the constituents to which it owes its therapeutic reputation and value. Micro-chemical tests should be introduced to a much larger extent in laboratory class work.

With respect to nomenclature, Dr. Viehoever expressed himself in favor of specific terms and the elimination, as far as possible of unspecific synonyms. His arguments were along the lines of his paper on "Popular Names of Crude Drugs," printed in the *Jour. of the Amer. Pharm. Assoc.*, Vol. 9, 1920, pages 671 to 676.

**Methods of Instruction in Laboratory of Professor Tschirch.**

In the symposium on laboratory methods of instruction Dr. Dittmar described the methods employed in Professor Tschirch's laboratory at the University of Berne, Switzerland.

The student enters the pharmaceutical institute of which Professor Tschirch is the director with a very excellent theoretical and practical training. The admission to the institute is based upon the student having successfully completed three semesters of study in the natural sciences, botany, chemistry and physics and also three semesters of work in a practical pharmacy.

Thus equipped the student takes up his work in the institute. Here he specializes in pharmaceutical chemistry, toxi-

cology, pharmacognosy, pharmaceutical botany, hygiene, bacteriology and the chemistry of foodstuffs.

During each of the three semesters which the student spends at the institute some special phase of pharmacognosy is studied in the laboratory. In the first semester the student learns the various cellular elements and cell contents of the drug plants. He studies these both microscopically and microchemically.

In the second semester the comparative pharmaco-anatomy of various drugs is studied. Thus, for instance, the leaf drugs are studied in a group so that their differentiating characteristics may be more easily compared.

In the third and last semester a study of the foodstuffs is made. Professor Tschirch lays great stress upon correct drawings. His favorite saying, "He who has not observed correctly cannot draw correctly" is heard many times during the course of the semester. All slide preparations are prepared by the student himself from the actual drug. A study of powdered drugs is not taken up in the regular pharmacognosy course. This is done in a special course for itself. The laboratory course is supplemented by a very excellent series of lectures.

The presentation by Dr. Dittmar was followed by a detailed discussion by Dr. Newcomb in which he outlined the method followed at the University of Minnesota in utilizing the medicinal plant garden for imparting instruction in pharmaceutical botany and pharmacognosy. A general discussion followed in which all took part. The general thought was that the medicinal plant garden was one of the most valuable parts of a modern college of pharmacy. Emphasis was placed upon having students work with authentic material in comparison with commercial samples. It was felt highly desirable for students in pharmacognosy to carry out histological and microchemical tests as well as assay processes on products which they had actually produced themselves from plants growing in the gardens.

Professor Hogstad showed blueprints and described a new pharmacognosy laboratory table which he had designed and had found very satisfactory. He also explained with the aid of photographs interesting details of his new laboratory.

## VI.

## CHEMICAL CONTROL OF ECONOMIC PLANT PRODUCTS.

The feature of the evening session on Thursday was an address by Dr. Viehoever on Cyanogenesis.

### Cyanogenesis.

Dr. Viehoever discussed the subject of cyanogenesis mainly on the basis of his experiences with beans of the lima type (*Phaseolus eunatus L*). All these beans yield hydrocyanic acid, though in greatly varying amounts. While the lima beans grown in this country yield but small amounts not considered harmful, beans from tropical regions are generally found to yield notable quantities of the toxic hydrocyanic acid. An extended chemical survey showed that domestic beans yielded from mere traces to about 10 mg. HCN per 100 gm. of beans. While Tapiramos (Central-American Beans) and Indian Beans, Burma and Rangoon, yielded from about 15 to 60 mg. and Java, or certain Philippine varieties yielded even over 300 mg. hydrocyanic acid (—0.3 per cent.) per 100 gm. of beans. The amounts were shown to vary not only in the same shipment but in the same sack, and even in seeds collected from the same plants.

The facts of cultivation, or composition of soil, have evidently less influence on the amount of linamarin, the cyanogenetic glucoside produced than the factor of inheritance.

Soaking in water of the whole bean does not remove completely the glucoside. Soaking of the beanpowder in water removes too much of the valuable protein constituents to make it practical. Cooking destroys the enzyme without rendering the beans harmless, since hydrocyanic acid may be formed from the glucoside as a result of fermentation action of digestive ferments in the system.

Beans of the lima type can be readily differentiated from beans of other types by morphological characteristics of the plants, and anatomical as well as chemical characteristics of the seeds. An abstract of the monograph prepared on the subject entitled "Edible and Poisonous Beans of the Lima Type" (*Phaseolus eunatus L*) is published in the *Journal of the Washington Academy of Science*, page 47, 1922.

In the discussion, Dr. Viehoever also emphasized the fact that hydrocyanic acid disappears during macerations as had been shown in his studies of *Tridens flavus* (Tall red top) published in the *Journal of Biological Chemistry,* 25, pages 141-150, 1916.

He called attention to the method which had been developed in the Pharmacognosy Laboratory, United States Bureau of Chemistry, on the determination of small quantities of hydrocyanic acid (published in the *Journal American Chemical Society,* Vol. 37, pages 601-607, 1915, and those methods which were worked out in his laboratory for the hydrolysis of linamarin and the subsequent determination of hydrocyanic acid as published in the *Journal of the Association of the Official Agricultural Chemists,* Vol. 4, pages 144-155.

He finally mentioned the many interesting changes which take place in the metabolism of cyanogenetic plants, for instance that sweet almonds yield hydrocyanic acid in immature condition and that even on the basis of only a few experiments with wild cherry bark he believed that the largest amounts of hydrocyanic acid may be found in the young buds and the young bark rather than the fall bark, as stated in textbooks.

Professor Gathercoal, in discussing the address, called attention to the interesting presentation by Dr. Jose Simpson on this subject as submitted to the College of Pharmacy of Havana and which is printed in English, page 1792, General Circulars, U. S. P. Revision Committee. Under sweet almond he states that the odor of hydrocyanic acid in a dilution of 1 part in 100,000 parts of water is perceptible to men, but no woman who has made the test under the same conditions has noted the odor of prussic acid even in simple solution of 1 part in 20,000 parts of water; this confirms the hypothesis that man notes smell sooner than woman. As 10 per cent. of bitter almonds admixed with sweet almonds and made into almond emulsion would give about 1 part of HCN in 100,000 parts of water and as the U. S. P. test for the detection of bitter almonds in sweet almonds is by noting the odor when the drug is rubbed up with water the item is of interest to us. Dr. Simpson recommends a picric acid test for the detection of bitter almonds admixed with sweet almonds.

**Edibility of Plants Used as "Greens."**

Professor E. J. Petry, the Consulting Botanist of the South Dakota State College of Agriculture and Experiment Station, discussed briefly his intense interest in the various demonstrations of the Plant Laboratory Seminar. He then took up specifically the questions of edibility of various plants when used as "greens." The question of when such plants as brake fern, nettles, docks, rhubarbs, pokeweeds, etc., become too poisonous or undesirable for use as foods, was asked because such data are desired for part of a new bulletin. What methods, if any, are advisable in removing or counteracting poisons which may be present in such plants? After brief discussion, it became apparent that many desirable data are still wanting in the answers to these questions.

The plants which cause hay fever by their air-borne pollen were also mentioned as a desirable item in a new publication. Further sources of data were located as a result of discussion.

In the several fields and garden trips the Consulting Botanist secured nearly one hundred of the rarer plants of the Minnesota river valley, besides noting about 200 of the commoner plants. This is of much value in connection with work on the South Dakota flora, because the Minnesota river basin reaches over into South Dakota where it comprises parts of several of the northeastern counties.

In an investigation upon the Resin Content of Podophyllum (21st Mich. Acad. Sci. Rept., 1919), Dr. Petry had to confront the difficulty of grinding a resinous drug without being able to solve it satisfactorily.

The daily demonstrations of drug grinding in the pharmacognosy Laboratory at the university, and the visits to the wholesale drug houses in Minneapolis very satisfactorily answered this difficult question. Those centrifugal grinders are truly wonderful machines. The visits to the flour and woolen mills gave many new ideas and experiences which were heightened in many cases by the friendly discussion of various phases of the work and causes of accidents. This applies also to the drug houses visited, where, in addition, something was learned about the physiological effect of the dusts and fumes produced by the grinding of various drugs.

Dr. C. H. Rogers exhibited fruit and seed of Nigella damascena and gave the result of some work which he had done on the oil of the seed. This oil contains large amounts of methyl anthranylate, representing artificial grape flavor.

Professor Hogstad gave a review of his work on chenopodium, American Wormseed, pointing out that he had been able to cultivate the plant in South Dakota and to obtain a volatile oil similar in composition to that obtained commercially in Maryland.

## VII.

## STUDIES AND DEMONSTRATIONS IN BIO-CHEMISTRY.

Friday morning the entire group visited the Department of Agricultural Bio-Chemistry, where demonstrations were presented by members of the staff. Modern methods of studying vitamins were first considered, this subject being presented by Dr. L. S. Palmer.

### Modern Methods of Studying Vitamins.

The theory of the existence of vitamins is the result of development along two quite distinct lines of research. One of these has to do with the relation of chemically unknown food constituents to specific diseases and the other to the necessity of the same or associated substances for normal growth and nutrition. The methods which must be employed for studying these chemically unidentified food elements, which have come to be known as vitamins, must have as their bases either or both of the relations mentioned, *i. e.*, the relation of vitamins to the so-called deficiency diseases, and the relation of vitamins to normal growth and nutrition.

The idea that a disease may have its etiology correlated with a deficiency of some nutritive factor is by no means a new one. Kramer, as early as 1720, pointed out the relation of green vegetables and fresh juices of the citrus fruits to the cure and prevention of scurvy; and Lind, writing in 1757, pointed out that while lemon juice retained its antiscorbutic property for a long time, there was no hope of preventing scurvy

with dried spinach since this had lost "something contained in the natural juices of the plant," which "no moisture whatever could replace."

Takaki, a Japanese medical officer, in 1885 laid the foundation for the relation between another disease and nutrition by practically wiping out the disease beriberi in the Japanese navy through the substitution of barley for the polished rice which previously had been the chief article of diet. It remained for Eijkaman, a Dutch physician, to demonstrate during the last decade of the nineteenth century that beriberi could be produced experimentally in fowls by a polished rice diet and cured and prevented by the administration of rice polishings. In addition he demonstrated that the curative effect of the rice polishings was not due to any known food constituent. Following much experimental effort on the part of others to identify chemically the anti-beriberi substance, Funk, in 1911, isolated what he believed to be such a substance and ascribed to it the name "beri-beri vitamine."

Shortly after this (1911) Osborne and Mendel found that a characteristic eye disease could be produced in rats on diets devoid of animal fats and cured by the feeding of butter fat, cod liver oil, and other fats found in the glandular organs of the animal body. This disease has been found to be caused by a xerotic condition of the cornea with a resulting bacterial invasion. It has come to be referred to as ophthalmia, xerophthalmia, conjunctivitis, or keratomalacia.

Besides these three deficiency diseases, xeropthalmia, beriberi, and scurvy, each due to the absence of a specific vitamin, the disease rachitis (rickets) is evidently related, in part at least, to a vitamin deficiency. In addition there are a number of other pathological conditions in which a lack of vitamins may be suspected as etiological or at least contributing factors. The names which have been given to the recognized factors are as follows:

Vitamin A—Antixerophthalmic
Vitamin B—Anti-beriberi
Vitamin C—Antiscorbutic
Vitamin D—Antirachitic

The idea that nomal growth and nutrition is governed in part by vitamins came about through the failures resulting from attempts to nourish laboratory animals on purified food constituents, *i. e.,* a mixture of pure proteins, carbohydrates, fats, and mineral salts. The discovery that small additions of natural foods or extracts therefrom prevented such failures goes back to the observations of Lunin in 1881 and was amplified greatly by the work of Hopkins in 1906. It remained for Osborne and Mendel, and McCollum and Davis, however, to show that the same foods and particularly the partially purified chemical extracts of the foods which contained the antixerophthalmic and anti-beriberi vitamins are also required for normal growth and nutrition. Whether the same or merely associated substances are concerned remains to be determined.

This brief historical background will make clear the basis for the methods now employed in vitamin studies. The distribution of vitamins in natural foods or their products can be determined either through the effectiveness of the product as a cure for, or preventive of a deficiency disease, or as a carrier of a necessary growth promoting factor when fed in conjunction with an otherwise adequate dietary. When the relation of vitamins to disease is employed it is necessary to select an experimental animal which is susceptilbe to the disease in question and very sensitive to a deficiency of the vitamin which prevents the disease. For this reason the pigeon is employed for a study of anti-beriberi vitamin B, and the guinea pig for antiscorbutic vitamin C, and the rate for antixerophthalmic vitamin A. When the relation of vitamins to growth is employed it is necessary to select a rapidly growing animal whose growth is sensitive to a vitamin deficiency. The albino rat is used mostly for this purpose because it grows at a rapid rate and is very sensitive to a deficiency of growth-promoting vitamin B and also to growth-promoting vitamin A if reared under a nutritive regime which prevents a storage of the latter vitamin.

An extremley important factor in present-day vitamin research is the selection of the basal dietary for the experimental animal. Fortunately in one case, *i. e.,* in a study of the anti-beriberi vitamin, this becomes a simple matter inasmuch as polished rice alone and water has been found to be a sufficient diet to feed to pigeons along with the vitamin B carrier. In

this connection it should be stated that it has been found best to study the anti-beriberi vitamin carriers from the preventive standpoint rather than from a curative point of view, the procedure being to determine the minimum daily dose of vitamin carrier which will protect the pigeon from beriberi for a certain interval of time, usually two or three weeks.

In studying antiscorbutics or growth-promoting vitamins much more care must be used in the choice of the diet. For the guinea pig a balanced diet of grains, hay, and salt, with some animal protein like casein and a little cod liver oil or butter fat to prevent constipation and furnish vitamin A, will cause scurvy in a young pig, weighing 250 to 350 grams, in fourteen to twenty-one days. The procedure for testing the antiscorbutic power of an unknown food or food product is to determine the minimum daily dose which will protect the pig against scurvy for at least four to six weeks. Young, healthy pigs must be selected which will readily eat the food to be tested. Pigs must also be protected carefully from cold and drafts as they are very sensitive to respiratory and lung diseases.

The preparations of the basal dietary for the study of vitamins with rats in most cases requires great care. All constituents of the basal dietary which are likely to be contaminated with vitamins A or B must be thoroughly extracted with hot 70 per cent. alcohol and then with ether. It has become customary in most laboratories to prepare a basal diet made up of casein, starch (or starch dextrin), agar, lard (or crisco) and mineral salts to which is added some carrier of either vitamin A or vitamin B depending upon which vitamin is to be tested for in the unknown product. A typical basal diet for testing for growth-promoting vitamin B is as follows: Casein, 18 per cent.; butter fat, 5 per cent., unknown vitamin B carrier any desired percentage, dextrin to 100 per cent. When the unknown product is to be tested for vitamin A, butter fat is omitted and vitamin B is supplied either as alcoholic extract of ether extracted wheat germ equivalent to 15 per cent. germ in the diet (this extract is first evaporated on dextrin) or as pure whole dried yeast given separately at the rate of 0.4 to 0.6 grams daily. The nutrition laboratory at this department prefers the wheat germ extract because it carries less nitrogen of an un-

known nature than yeast when the latter is fed at the level mentioned.

In determining growth-promoting vitamin B in an unknown food, the procedure is usually to determine the percentage of the diet, or the daily intake if fed separately from the basal diet, which will promote normal growth in the young rat for at least three months. The same procedure is followed for testing for growth-promoting vitamin A. A somewhat simpler test for vitamin A, however, is used by a number of laboratories by producing xerophthalmia in young rats in a vitamin A free diet and then determining whether the unknown food will cure this condition. As previously mentioned, however, this method requires the use of a special diet for rearing the young rats to be used for the test, namely, a diet which will prevent a storage of vitamin A in the young rat; otherwise the appearance of xerophthalmia on the basal diet will be greatly delayed.

A word or two should be said regarding the management of a rat colony for vitamin work. Each laboratory should breed its own rats for experimental work. Just as careful records should be kept of the growth and condition of the rats in the breeding colony as in experimental cages. Only rats of known breeding and parentage should be used for growth experiments. Reasonable cleanliness, light, ventilation, and moderate temperature are obvious objects for which to strive. An excellent antiseptic which can be sprayed into the cages and on the rats, if necessary, to prevent vermin of all kinds is pure pine oil. Breeding colony rats should be provided with sawdust or shavings, to be changed at least once, or, if possible, twice weekly. Experimental animals must be kept on screen floors, using a mesh three to the inch to eliminate as far as possible the eating of the feces. Feeding cups must be used which make possible the quantitative determination of the food intake of all experimental rats. In the type of experiments here described with rats, each animal should be handled as an individual in a separate cage. Finally, accurate records should be kept in great detail of the behavior of each animal on experiment.

**Plant Colloids.**

Dr. R. A. Gortner next took charge of the group, explained and demonstrated the apparatus in the plant colloid laboratory and spoke on the present status of colloid chemistry.

(For a general statement of the field and nature of colloid chemistry see "Theoretical and Applied Colloid Chemistry," by W. Ostwald, translated by Martin Fischer, John Wiley and Sons. This may be followed by "Colloids in Biology and Medicine," by Bechold, D. Van Nostrand Company.)

The colloid state may be defined as a universally possible state of matter in which the size of the particle determines its chemical and physical activity. This may be seen from the following diagram:

| matter in mass | colloid realm | true solutions |
|---|---|---|
| | 1 | |
| | .1 micron | 1 milli micron |

in which the upper limit of size of a colloidal particle is .1 micron and the lower limit 1 milli micron or 1/1,000,000 of a millimeter. Any substance existing in solution or in suspension which has a size within this range may be spoken of as in the colloidal state. There are several possible colloidal systems such as "solid in gas" or smokes, liquid in gas or "fogs," etc., but for our purpose we can consider only the groups, "solids in liquids" and "liquids in liquids" as being of importance from the biochemical standpoint.

Within these groups there are two great subdivisions:

(a) Systems mutually soluble in each other. These we call "emulsoid colloids." One of the best-known examples is gelatin-water system. Here water dissolves in the gelatin and gelatin likewise dissolves in the water. We call colloids like gelatin "hydrophylic" or water-loving because they absorb a large volume of water and are strongly hydrated.

(b) Systems mutually insoluble in each other. These are called "suspensoid systems." One of the best examples is colloidal gold in water. This forms a brilliantly colored liquid but it is self-evident that the water is not soluble in the gold nor is the gold appreciably soluble in the water. For the present

we can disregard the suspensoid systems and confine ourselves to emulsoid systems.

The emulsoid systems have many interesting properties but from the biological standpoint probably their most important function is in relation to their ability to imbibe water and to hold it rather tenaciously. Nelson and Hewlitt (*J. Ind. Eng. Chem. 12,* 40-45, 1920) have shown that biological materials such as starch, wheat flour, etc., retain appreciable amounts of moisture even when dried at 110° C., and it is believed that this property is due to the colloidal nature of the material.

It is in the deserts that we see one of the extremes of plant life. In order to survive under desert conditions a plant must provide a mechanism whereby it can draw water from a moisture-depleted soil and at the same time hold moisture in its own tissues against transpiration. Two mechanisms have been developed by the xerophytic plants. One of these consists in holding soluble carbohydrates and salts in solution in the cell sap, thus raising the osmotic pressure of the cell sap. This mechanism undoubtedly is fairly effective but it is the succulent xerophytes such as the cacti which have the most efficient mechanism. In such plants the osmotic pressure is usually extremely low but their hydrophylic colloid content is very high and the colloids such as the plant gums and mucilages are able to imbibe water during and immediately following the infrequent desert rains and to later on hold such water against the drying soil and against transpiration. Evidence is at hand that agricultural plants grown under dry-farm conditions may differ greatly in their capacity to elaborate hydrophylic colloids and that their chance of survival in a dry environment is closely related to this property.

Winter hardiness of cereals has likewise been shown at Minnesota to be due to the elaboration of hydrophylic colloids in the plant during the process of "hardening off." Those wheats which are extremely winter hardy may elaborate so much and so efficient hydrophylic colloids that practically no "free water" remains in the cell or in the intracellular spaces. The result is either that freezing of the protoplasm does not take place or that the freezing is not able to withdraw water from the protoplasmic colloids and no harm results. A measure of the hydro-

phylic colloid content of a wheat, properly hardened off, may be regarded as a direct measure of its winter hardiness.

These two illustrations show what profound influence colloids may have upon plant life. They are equally important in the animal organism. The things we eat are colloids, our clothes are made of colloidal materials, in fact both the plant and animal life, as we know it, would be incapable of existence were it not for the series of phenomena which we call colloid chemistry.

## VIII.

## PHARMACOLOGIC DEMONSTRATIONS AND STUDIES.

On account of the absence of a few of those whom it was hoped would attend the Seminar and present a number of discussions, the Friday afternoon and Saturday morning programs were combined. Most of the time Friday afternoon was devoted to demonstrations and papers relating to pharmacology.

Mr. H. C. Hamilton then presented a paper accompanied by demonstration on Digitalis and its standardization.

### Digitalis.

The growing, gathering, drying; extraction and standardization:

Among the various varieties of digitalis, *Digitalis purpurea* was probably selected as official on account of its larger leaves, its more common growth and possibly on account of the beauty of the flower. It is no more active than some other varieties and in fact has been found very considerably less active than the narrow leaf *Digitalis lanta.*

The leaves of the second year's growth were selected as the official drug, and the wisdom of this selection too is open to question for the second year's growth leaves are no better than and possibly not so good as the first year's growth. Possibly this selection was on account of the lack of stems of the leaves, and possibly because it was assumed that the full virtue of the plant would only be found at the flowering stage. The first year's growth has usually larger leaves and the leaves occur in greater abundance. When carefully selected and the

activity is fully as high. In some localities where the plant is winter-killed and only the first year's growth is available, one makes a virtue of necessity and chooses, of course, the first year leaf.

The question of drying is very closely associated with the activity to be found in the final product. While there is no particular virtue in the high temperature for drying, with the thought that the ferment will be killed, repeated attempts have demonstrated that quick drying at a reasonably high temperature, by which the leaf is thoroughly dried in twelve to twenty hours, is a very great advantage in retaining the full activity of the leaf. The dried drug retains its activity almost unchanged for years. I have examined drug that was at least twenty years old and found it fully as active as the average drug at present obtainable on the market. The original assay of this drug was not available to determine whether any loss had occurred, but repeated experience indicates that when properly dried the drug is absolutely stable in this form.

The University of Minnesota is to be commended for its work in popularizing the drug and in demonstrating that it can be grown at home and be as satisfactory as any imported material. The various factors concerned—collection, drying, powdering and extracting, have demonstrated the high value to be found in home grown material. After, however, these facts have once been established, it seems unfair for a state institution to compete with the processes from crude drug to finished product better than any other institution.

The fact that digitalis is so absolutely stable in its dried powdered form suggests its use in that form for clinical purposes. This has been in practice to a limited extent and appears to have given very good satisfaction. No great amount of digitalis, however, finds its way on the market in the form of the powdered crude drug; neither is there any great amount of digitalis used for the extemporaneous preparation of galenicals, with the one exception of the infusion. The infusion of digitalis is one preparation which seems to have no redeeming feature, except that of convenience in preparing. It is unstable and retains its activity only for a short period, unless under exceptional conditions.

In accordance with the international agreement most of the alcoholic extracts of digitalis are made with 70 per cent. alcohol, and there is no evidence that other strengths of alcohol or other menstrua, extract agents materially different from those which occur in the 70 per cent. alcoholic extract. This strength of alcohol has several advantages: It extracts the drug completely and with a minimum amount of the inert extracted matter, a factor which favorably affects the stability of digitalis. Further, when so extracted the preparations retain for a longer period their full activity. An extract prepared either with 95 per cent. alcohol or with water alone, contains too large a proportion of substance objectionable for clinical uses.

Several processes of purification have been worked out, one of the simplest of which is the removal of fat. The advantage of this step of purification was supposed to be a removal of the nauseating principles. This is a mistake, however, for the nauseating action is due not to any impurity present, but to the inherent properties of the active agent of digitalis. The preparation of the fat-free tincture was a commendable step in that it makes for greater stability. The stability of digitalis preparation can be still further increased by the removal of large quantities of water-soluble materials, inert and not merely inert but leading to rapid deterioration of the activity. It is easily possible to remove 80 per cent. of the extractive found in the ordinary tincture or fluid extract without material loss in the activity of the product. Purified in this respect the absorption is much more rapid from the stomach, as evidenced by the higher toxicity from internal administration of the purified preparation as compared with its toxicity hypodermically administered. The purification process leaves the hypodermic toxicity practically unchanged, while the minimum lethal dose from internal administration is decreased to one third. Since digitalis is almost invariably administered internally, such a purification is one of the steps of very greatest importance. Any method of purification or the selection of a special constituent, demonstrated by intravenous administration, has little relationship to the improvement demonstrated by internal administration.

*Standardization.*—This is so frequently confused with pharmacologic action, that is the study of the action of the drug, that one loses sight of the fact that the mode of administration, the selection of the animal, and all the various details of the process of standardization are not concerned in the least with the clinical use of the drug. In the earlier studies of digitalis the pharmacological action was of first importance. However, after establishing the value of digitalis as a heart tonic and the mode of its operation, the next step is the standardization, and the method by which this is accomplished should be of the very slightest importance to the physician. The important point is the degree of accuracy of the method, which should be based on some typical, clinical effect capable of fairly exact measurement. If this were kept clearly in mind much of the discussion of methods could be looked on as wasted effort. Whether one uses the guinea-pig, frog, mouse, the dog, cat or the goldfish, should depend absolutely on only one point: which is the more accurate? Which measures the value in the most dependable manner? We have occasional cases in which the physician asks us specifically for digitalis tested by the cat method, apparently assuming that the method of assay confers a special virtue on the drug. In only one respect can it be assumed that the cat method has an advantage over the frog method and that is, in the fact that the cat is a warm-blooded animal. Very little virtue resides in this fact, however, even if the most important question is that of dosage. While it may be possible to deduce human dosage from the effect observable on the cat, considering that the digitalis is administered intravenously, there is little apparent reason for such deduction. The cat method, as originally outlined by Hatcher, was far from being original with him, since it was one of the first methods used in Germany for the standardization and testing of digitalis. The various scientists who have experimented with this method have almost without exception admitted the wide variability in their results. Even Dr. Newcomb, who uses it to the exclusion of all other methods, states that the method which he uses has been improved by various steps which remove it from the classification as the Hatcher method.

One other method of standardization has been recently suggested, and it illustrates how far afield it is possible for a physician to stray when he allows his imagination to run riot. This suggestion was that of using the human as a means of standardization, the test being carried out by means of the electro-cardiograph. The end point of the reaction, if it may be so called, is the measurement of the change in the T-wave, a change in the height of a wave which at most is less than 1 mm. or a twenty-fifth of an inch. This, to my mind, is entirely too delicate a reaction by which to measure the value of a preparation for human use. The electro-cardiograph is valuable to the physician, insofar as it tells the progress of the action of the drug and the point at which the dose should be increased or diminished. It is not at all adaptable to the standardization of digitalis, since the patient is necessarily too variable in his response to the drug to make the test on one person valuable for another.

The method in use in our laboratory, commonly known as the M. L. D. frog method is the original of the frog methods. The end point of the test is the dose which kills the frog, that is, the majority of the frogs used at that dose; larger doses invariably kill, while from smaller doses the frogs invariably recover. This, of course, is based on the practice of excluding the exceptional animals which need not be considered as part of the data. The M. L. D. is no fixed quantity, it depends on the size, weight and condition of the frog, the temperature of the water, and the character of the weather. For that reason no exact figure can be given for the M. L. D. of any particular digitalis preparation; as, for example, the standard. This variability is taken care of by use of a standard preparation. In our laboratory we use pure crystalline strophanthin from Kombe seed. By this means we eliminate all the factors of variation which would otherwise invalidate the test.

The modification selected by the U. S. P. Revision Committee, which is known as the M. S. D. method, has several minor points of difference. In this method the end point is the dose which will stop the beating of the heart of the frog with the heart in systole in one hour. There is no marked difference between the two methods. There is, however, a dif-

ference in the cost of animals and time consumed in favor of the U. S. P. method. This, however, is at the expense of accuracy. The question of accuracy is largely bound up with the question of the number of frogs used in the test. The M. S. D. method economizes on frogs and, necessarily so, because otherwise it would at the same time be very time-consuming. It is also vitiated to a certain extent by the fact that different preparations vary in their absorbability from the lymph sac. When we consider that the action of digitalis, clinically administered, is of slow duration, permitting the absorption of all the constituents of the digitalis and their slow action on circulation in its various parts, it seems more or less illogical to use a method in which the action of the drug must be exhibited in one hour. Other than these points, the selection of one or the other of the two methods is merely one of personal convenience. The M. S. D. is no more fixed than the M. L. D. and, in fact, to those who are familiar with the variations of different animals it is illogical to expect that the M. L. D. even for cats will be invariable.

The chief points of discussion had to do with this question of the actual M. L. D. and why it should vary. This, however, seemed to be perfectly clear after a careful explanation. The question of how accurately the material can be administered was brought up by the description of an apparatus for such administration, by which a screw-valve was used to measure the dosage. This, after a reasonable amount of experience, seems entirely unnecessary.

The chief discussion of the paper, was by Dr. Newcomb, who gave in more or less detail the method that he follows, the accuracy with which he measures digitalis action, and the points at variance from the Hatcher method. He admits its limitations but considers that it far surpasses the Hatcher method in accuracy and dependability. He considers, too, that it is susceptible of improvement and hopes to develop a technique which will eliminate some of the factors tending toward the inaccuracies which every worker in pharmacology has experienced.

Dr. Newcomb called particular attention to the report of the A. Ph. A. Committee on Physiologic Assay which was sub-

mitted at Cleveland. He pointed out that his analysis of unknown samples of tinctures of digitalis by the cat method which he employed gave results practically identical with the results reported by those who used the frog method.

Dr. Hugh McGuigan, University of Illinois, in discussing the outline of the cat method as given by Dr. Newcomb, stated that in his use of the cat method, he had always felt some doubt about the action of the anesthetic. In some cases he felt that death was due to the anesthetic, or at least to a combination of the anesthetic and the digitalis. He asked, therefore, what precaution was taken to keep the anesthesia uniform.

Dr. Newcomb replied that when the injection of the digitalis was commenced, the anesthetic was either entirely removed, or given in very small amounts.

Dr. McGuigan continuing said: This point in technic I think is important. If it can be carried out by others as easily as Dr. Newcomb states, and I have no doubt a little practice will give this facility, it adds greatly to the value of the method, by removing one of its greatest defects.

In discussing Mr. Hamilton's paper and demonstration, Dr. McGuigan complimented Mr. Hamilton on the excellence of the demonstration. He asked questions in detail about the size, and preparation of frog used, the influence of dilution of the drug, temperature, etc. He said so far as he could judge, the method seemed as good as any frog method proposed and had many points in its favor. By taking death with the heart in systole as the end point, he thought the discrepancies between the results of the frog method and the cat method, which seem due to differences in the rate of absorption, would be harmonized.

### American Ergot.

Domestic ergot was next taken up for consideration. Dr. Newcomb exhibited samples of grain screenings containing 17 per cent. of ergot. He also discussed experiments which had been conducted to separate the ergot from the grain and foreign seed by mechanical means. No satisfactory process for doing this work has thus far been devised. He referred to the hand-picking of the ergot which had been carried on with large

quantities of the screenings, the screenings being turned over to working people, mostly of foreign descent, who received a small price per pound for the ergot which they separated by hand. The remaining cereals were used for poultry feed. Tests which had been made by the cock's comb method indicated that domestic ergot was in some cases, at least, as valuable medicinally as that imported from abroad. Dr. Newcomb discussed briefly the supply of American ergot, and stated that no reliable statistics were available, but that some years large quantities of ergot might be obtained in the screenings from the Northwest grain fields. He also exhibited a sample of wheat ergot, which differs from that obtained from rye in that the sclerotia are shorter in proportion to their thickness.

Dr. E. D. Brown next offered a number of demonstrations and a discussion on his research work relating to plant dermatitis.

### Plant Dermatitis.

During the past three or four years an experimental investigation has been carried on with some of the plants which are known to produce a dermatitis of varying degrees of severity on certain individuals. It has been shown that there is a variability in susceptibility between different people, and there is strong evidence that a personal variability in susceptibility may exist depending upon various factors, some of which cannot be explained.

Primula obconica is one of the plants belonging in this group which is not an uncommon offender. During an attempt to isolate the irritant principle, two bodies were obtained, both of which possessed the properties of a saponin. One of these is crystalline, in the form of colorless microscopic needles resembling quinine sulphate in appearance, while the other is amorphous and of a brownish color.

The crystalline body when injected into a frog showed a low degree of toxicity, while the amorphous body was fairly toxic to frogs. It was observed that it caused a marked edema in the frog when a dose was injected that would kill at the end of twelve to twenty-four hours.

Experiments made to determine whether either of the substances was responsible for the production of a dermatitis were unsuccessful, but there has been no opportunity to try them on a person known to be susceptible to the primula plant.

Poison Ivy. Experiments have been made which prove conclusively that the irritant principle in poison ivy may be carried in the smoke from the burning of the plant. This was done by incinerating the dried stems and collecting the soluble portion of the smoke in a series of wash bottles containing water, alcohol and ether.

The insoluble tarry mass collected in the water as well as the soluble portion collected in alcohol were both active when applied to the intact skin. This caused a dermatitis on all individuals to whom it was applied.

Vanilla. Having had brought to my attention four cases of dermatitis caused by the handling of chopped vanilla beans used in the process of preparing extract of vanilla, it was considered worthy of an investigation.

The first procedure was to apply vanillin in the form of an ointment, and also in alcoholic solution, to the arm of a group of people, and note the results. In no case was there any evidence of a skin reaction.

It was reported that one of the members of the group who had been affected by the drug had come in contact with the marc only, after the desired portion had been extracted. Some of the marc was therefore subjected to a further extraction by means of various solvents. The products obtained from this extraction were applied to a group of people, and in no case was there any evidence of a dermatitis.

A demonstration was given showing the repellent effect and toxic action of some of the anthelmintic drugs to earth worms. The method employed has been described by Sollmann in the *Journal of Pharmacology and Experimental Therapeutics,* 1918.

In discussing the treatment of Rhus poisoning, Dr. Plitt stated: "To allay the itching caused by Rhus poisoning, he had found carbolic acid (phenol), dissolved in xylol most useful, one part of the phenol in three parts of the xylol. Use cautiously, touching the itching parts lightly with a camel hair pencil dipped in the solution."

These demonstrations were followed by a presentation by Dr. C. O. Rosendahl on the "Methods for Collecting and Preparing Pollen for its Use in the Treatment of Hay Fever." Earlier in the week Dr. Rosendahl had demonstrated in his own laboratory the method of separating the pollen from fresh plant material which had been brought in. During his talk he exhibited samples of different types of pollen which he had prepared.

**Pollen in Relation to Hay Fever.**

It is becoming more and more generally recognized that the chief cause of hay fever is the pollen from a variety of anemophilous or wind pollinated plants. In the Minnesota flora there are about 450 species of anemophilous plants, distributed among a considerable number of families, but of this total number only comparatively few species play an important part in the causation of hay fever.

These species may conveniently be arranged in six groups based partly on the season of flowering.

The first of these is the *Tree Group* embracing cottonwoods and poplars, oaks, elms, birches, hazels and elders, maples, ashes, hickories and walnuts. These blossom from early spring until about June first and are responsible for some of the spring "colds." The duration of flowering of any single species or of several related species is comparatively brief so that the disturbance is not prolonged and generally passes off without any serious inconvenience to the patient.

The second group is the *Grass Group* and this is of major importance for this locality. The blossoming period begins about June first and lasts until early September yet the main bulk of the grass species bloom during the latter half of June and through July. Perhaps over 75 per cent. of the cases of hay fever due to grass pollen is caused by Kentucky blue grass, timothy and red top. Other species which also contribute are some of the cereals like rye, oats, barley and corn.

A third group is made up of the *docks* numbering only a few species but of widespread occurrence as weeds in waste places and fields. These flower from about the middle of June into August.

A fourth group embraces the *pigweeds* and *lambs' quarters.* They are very common as weeds around buildings and barnyards and are therefore a source of considerable annoyance. The beginning of flowering of this group coincides with that of the third group that usually lasts longer, some species continuing until late autumn.

The fifth group is by far the most important one and is made up of the *ragweeds, cocklebur* and *marsh elder.* Three species of ragweed are common in Minnesota, ranging well up into the coniferous region of the state. Most of the autumn hay fever is due to these species and their time of blossoming in this vicinity lasts from about August tenth until frost. The species of this group, particularly the ragweeds, produce an enormous quantity of dry, buoyant pollen which is carried on the lightest air currents so that there is no way of avoiding inhaling it except moving into a ragweed-free area.

The last group is composed of the *wormwoods* or *sages* of which there are half a dozen species in this region. Although fairly common they are not nearly as serious a pest as the species of the next preceding group.

There is no known cure for hay fever, yet relief may be had in a majority of cases by inoculation with pollen antigen, prepared from the particular species whose pollen one is sensitive to. The immunity is not lasting however, and inoculation has to be resorted to each year. When this treatment fails to give relief the only recourse is to flee to some part of the north woods where hay fever plants either are absent or occur so sparingly as not to cause much trouble.

**Business Session.**

The Seminar was closed with a brief business session, at which time the committee on organization, which had been appointed earlier in the week, presented the following report:

> "Mr. President and Members of Laboratoy Seminar: Your committee on organization and name has given the problems entrusted to it careful consideration. It finds that the sentiment of those attending the Laboratory Seminar is unanimously in favor of continuing the work which has been so interestingly prosecuted during the past week. It would recommend the following for adoption by the members:

"1. That our organization be established on a permanent basis to meet annually for mutual conference and work.

"2. That the following officers be established within the organization: President, Vice-President, Secretary-Treasurer.

"3. That the present incumbent of the offices of president, Dr. E. L. Newcomb, and secretary-treasurer, Dr. Arno Viehoever, serve until the first meeting of the permanent organization.

"4. In respect to a name for the permanent organization, your committee would state that it has given this matter considerable thought without coming to a definite decision at this time. It would recommend that 'Plant Science Laboratory Seminar' be continued until the next meeting when it will be better prepared to offer a name in keeping with the diverse character of the work contemplated.

"Respectfully submitted,

H. W. YOUNGKEN, *Chairman,*
E. N. GATHERCOAL,
O. P. M. CANIS,
HUGH MCGUIGAN."

The report was unanimously adopted. A vote of thanks was then extended to all at the University of Minnesota for the services which they had rendered in making the Seminar a success. Professor Petry was elected vice-president; Dr. Viehoever, secretary-treasurer, to serve until the ensuing year. A vote of sympathy was extended to Professor E. N. Gathercoal on account of the ether burns which he suffered in an accident while conducting experiments at the Seminar. It was voted to make an assessment upon each member attending the Seminar of $1 to form a nucleus of a fund for the conduct of the Seminar in the future. At this time Dr. Newcomb announced that the expenses of the Seminar, including the issue of announcements, etc., amounting to about $40, had all been paid by Dean Wulling. A vote of thanks was also extended to the McLaughlin-Gormley-King Company for the loan of bales of drugs.

A large number of communications were read from persons interested in plant science work throughout the United States who were unable to attend the Seminar. Among these was a letter from Dr. M. Nierenstein of the University of Bristol, as

follows: "I just have my copy of News Edition of *Industrial and Engineering Chemistry* and I notice with great delight your arrangements of the 'Plant Science Seminar.' I have for many years devoted my attention to plant chemistry and I only wish I could have the opportunity to take part in the Seminar. Fail ing this, may I wish you the best of success! I suppose you will probably publish proceedings of the meeting. If so may I ask you for a copy, which I shall be very pleased to have." —M. Nierenstein, Lecturer in Bio-Chemistry, University of Bristol. Also, the following telegram from Dr. Henry Kraemer: "Fraternal greetings to you and our American colleagues and pharmacognocists at this initial Seminar at the University of Minnesota. This will stimulate study and research. May it be an annual event, Regret I cannot be present."

In concluding this report, it should be stated that those in attendance at the Seminar voted at the opening session that each one should submit as soon after the close of the Seminar as possible a statement relative to the part taken in the demonstrations and discussions. The chairman agreed to bring together these different statements in a form suitable for publication. He has found this no small task. There are some omissions, as a few did not send in complete reports. The hope is expressed that any errors which may be present will be overlooked, and that in the future a more satisfactory method of conserving the records may be worked out.

Many of those who attended the 1923 Seminar have already submitted suggestions, and urged that a similar gathering be held at the University of Minnesota during 1924. These communications will be placed before the special committee named to determine the time and place of the next Seminar. This committee consists of Arno Viehoever, E. N. Gathercoal, E. D. Brown, Anton Hogstad, and E. L. Newcomb. Members of the University of Minnesota faculty who co-operated in conducting the 1923 Seminar will give every assistance in the development of a second gathering during the coming year.

(*Concluded.*)

## GLYCERIN AS A DISTURBING FACTOR IN THE TEST FOR METHANOL IN ETHANOL.

**By Charles Herbert LaWall, Ph. M., Sc. D.**

In a paper recently presented upon the subject of "The Detection of Methanol in the Presence of Ethanol" (Trans. Wagner Free Inst. Science, X, 1923, p. 55, reprinted in *Amer. Jour. Pharm.*, Nov., 1923, p. 812), an improved test was suggested which was based upon the revised test as proposed for inclusion in the U. S. P. X.

Several unfavorable reports were recently received from persons who, while working with unknown samples obtained positive results for the presence of methanol which could not be confirmed by the immersion refractometer method. These results were obtained in the examination of gin samples particularly, and the samples had been subjected to the test without previous distillation.

Knowing that glycerin is frequently used as an ingredient in synthetic gin and suspecting that this substance might be a disturbing factor, a test was made in which glycerin was added to the distillate at the beginning of the test. A positive reaction was obtained which was startling in the rapidity with which the color developed.

The tests were then repeated several times with known dilutions of glycerin and it was found that 1 part of glycerin in 500 gave a reaction at least equal in intensity to the presence of 1 per cent. of methyl alcohol in ethyl alcohol, and that a dilution of 1 in 2000 of glycerin gave a distinctly positive reaction. It was found to make little or no difference in the intensity of the reaction whether ethanol was present or not.

Knowing that glycerin volatilizes when the concentration reaches a certain point, experiments were next made to determine whether, under the ordinary conditions of an alcohol determination, enough glycerin would be carried over to give a positive result. Experiments were conducted with various alcohol-water-glycerin mixtures, which were subjected to distillation and tests made with various fractions of the distillate. It was found that no glycerin came over until the glycerin in the distilling flask reached a concentration of about 50 per cent. by volume.

In conclusion, it must be emphatically and positively stated that the presence of glycerin in a liquid used directly for the U. S. P. test for methanol in ethanol will give misleading positive results. Distillation, therefore, must always be resorted to with liquids which

contain any residue upon evaporation, and the distillation must be so carefully conducted that too great a concentration of the residue in the distilling flask is not permitted, for fear of carrying over glycerin with the last portions of the distillate in case it happens to be present.

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# ABSTRACTED AND REPRINTED ARTICLES

## REVIVING WITHERED FLOWERS WITH ASPIRIN.*

**By Norman D. Keefer, P. D.**

Before going into detail with aspirin or any method for the restoration of withered flowers, it is first necessary to try to learn what is the apparent cause for the withering. Since we know that death is inevitable after the flower is separated from the parent stem, it is our problem to stave it off as long as possible.

As soon as the flower is cut, life ceases and from thence the problem is one of preservation. Preservation is impossible with most flowers unless the moisture content is kept constant by means of replacement for that lost by evaporation. When flowers are placed in a vase of water, most of them will take up water fairly well for several hours, but sooner or later the base of the stem becomes clogged and the flowers suffer.

So far as I am able to learn, science is uncertain what causes the clogging but in time I believe we shall learn that it is caused by an autolytic or fermentation enzyme which either digests the cells on the cut surface or covers them with a gelatinous film which makes them impervious to water.

Upon analysis we find all of our methods of preservation tend to prevent the action of this fermentation by either physical or chemical means. By the use of cool temperatures such as cold storage, we are able to inhibit the work of this enzyme. Then by dipping the end of the freshly cut flower in hot water, we endeavor to prolong the life of the bloom apparently by not killing the enzyme. The uncertainty of this method is probably caused by either having the water too hot and killing the flower, or by not having it hot enough, and not killing the enzyme. A dahlia grower once told

*Reprinted from *The Flower Grower.*

me that he uses a small amount of potassium nitrate in each vase; as potassium nitrate (saltpeter) is an antiseptic, or at least a fungicide, we can readily see wherein this chemical is able to inhibit the action of the enzyme.

The latest method proposed is that of placing an aspirin tablet in a vase of flowers. Aspirin being a chemical combination of acetic and salicylic acids, the latter of which is a good antiseptic, we can readily see whereby the enzyme is possibly destroyed by the drug. That it is effective was proven on a vase of badly wilted chrysanthemums just recently. The blooms were let stand in a hot (seventy-six degrees) room over night, and were practically hopeless. In the morning they were given fresh water and an aspirin tablet. They revived in about two hours, looking as fresh as when cut the day before. I might add that while the flowers themselves came back the leaves remained wilted. The flowers then remained fresh for three days longer.

Two additional vases of 'mums were also experimented with, one with aspirin and the other without. They were kept under the same conditions and the aspirin-treated flowers outlasted the others by three days. To prove whether this happened to be a fact or an incident, the test will have to be tried repeatedly, and with other types and varieties of flowers. The suggestion came too late in the season to be able to try it on gladioli and dahlias, but it will be a great help in displaying dahlias on show, if it works with them as well as it did on the 'mums.

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## SOME CURIOUS MEDICINES.*†

**Chemistry and Medicine Closely Associated since Earliest Times But Modern Chemistry Has Substituted the Laboratory for Nature in Seeking Active Therapeutic Agents.**

**By Edward Hart, Professor of Chemical Engineering, Lafayette College.**

The relationship of Chemistry to Medicine is a very old one. When I can first remember, a chemist in popular language was a man who prepared medicines. It is only very recently that the idea

*Read before the Section of History of Chemistry, at the Milwaukee Meeting of the American Chemical Society.

†Reprinted from *Jour. Ind. & Eng. Chem. News Edition.*

of a chemist as distinguished from a pharmacist has taken shape. In my early days the terms were almost synonymous. Many of the early chemists were connected in some way either with medicine or pharmacy or both.

The earliest form of medicine in the history of the race grew from the idea that disease is caused by an evil spirit which must be frightened away by the medicine man, disguised in hideous masks and producing hideous sounds. Gradually a knowledge of simple remedies—heat-vapor baths, mineral waters and herbs—grew up and took form, sometimes very odd form, and the infant medicine was ready for partnership with the infant chemistry, which extracted from drugs the active principle, discovered medicinal properties in mineral substances, and in these later times prepared those thousand and one synthetic remedies which have completely transformed the materia medica.

In Pliny's "Historia Naturalis" innumerable remedies for disease are mentioned, most of which could have done no possible harm except that some of them were exceedingly nasty, and stimulated the imagination like a bread pill.

### The Search for a Panacea.

In that later time when the alchemists were industriously looking for the Philosopher's Stone which should transmute the baser metals into gold and silver, the idea gradually took shape of a medicine which should prove a panacea or remedy for all ills and at the same time be a renewer of youth. Sometimes this was to be a separate substance but usually it was identical with the Philosopher's Stone. In many cases it is nearly impossible to tell just what the alchemical writers did know or mean. Many of their writings may be interpreted either as containing concealed meanings or as verbal emptiness.

Boyle was possessed of the critical faculty to a much greater degree than his contemporaries, but when it came to prescribing remedies this seems to have taken a vacation. In his "Discourse on the Usefulness of Natural Philosophy" he doubts whether potable gold has all the wonderful properties so often ascribed to it though he does not absolutely reject the use of leaf gold, rubies, sapphires and other gems taken internally. He commends the occasional use of such remedies as the extract of horse dung. He recommends powdered wood lice as a remedy for the stone. The

primum ens of celandine is prepared by beating the herb in a marble mortar. This is then to be sealed hermetically in a bolthead for forty days. The liquor from this is to be mixed with an equal amount of the liquor of good sea salt well purified and allowed to run per deliquium. This mixture must be exposed to the sun for six weeks and at the end of this time there will swim at the top of it the primum ens of this plant in a liquid form, transparent and either green or red or perhaps some other color. This is to be dissolved in good wine and the tincture taken every morning. First of all the nails of the fingers, then those of the toes, afterwards the hair and teeth fall off; and lastly the skin is dried and exchanged for a new one. An old hen had her food moistened with some drops of it. After the sixth day she began to moult and became stark naked.

### Boyle's Contributions Not Very Choice.

In a collection of Choice and Safe Remedies, Boyle prescribes a solution of castile soap for jaundice. The ashes of pig's dung is to be given for dysentery, dried and powdered earth worms for convulsions, and the dried and powdered liver of a hare for convulsive fits. Some of his remedies are too revolting for description. It appears to have been the popular belief that the nastier a remedy the more potent it was likely to be.

In 1757 Carl Wilhelm Scheele, the greatest chemist of his time, and one of the greatest chemists of all time, entered the pharmacy of Martin Anders Bauch at Göthenberg. A list of the drugs on the shelves of this pharmacy has come down to us. It comprised: snake's fat, bears' and wolves' grease, men's heads prepared without fire, mummies, jaw of the pike, oil of tape worm, powder of vipers, powder of the true wild ox horn, powder of the fossil wild ox and hoofs of the elk.

### The Author Makes a Confession

I think that even in the present enlightened age some nonsense has survived. When my oldest boy was quite small the family physician was called upon to prescribe for him upon several occasions. At that time I lived well back upon College Hill and the distance to the doctor's office had to be traveled afoot, there being then no trolley line. After one of these jaunts in the evening taken after

a hard day's work, coupled with an hour's wait in the doctor's office, my inventiveness came into action. Most of the trips were after powdered oyster shell, which the physician assured me was much more useful as an anti-acid than anything else he had ever used. He took care to give out very small quantities which occasioned many trips. One morning I was admonished to get some more oyster shell. We had some beautiful calcite in the laboratory, and I powdered some of it very carefully in a Wedgewood mortar, did it up in neatly folded papers and handed out one of them on my return home. It was received unsuspiciously and appeared to work perfectly. I continued this course of criminal deception for over a year without detection. Only the fear of a hereafter and the necessity of eleventh-hour repentance induces me to confess now.

Two of the most curious remedies I have found in the literature are described by Nicolas Lemery in the fourth edition of his "Cours de Chimie," of which a translation into English was made by Walter Harris, Doctor of Physik. He tells us that "mercury is given in the disease called miserere unto two or three pounds, and is voided again by siege to the same weight; it is better to take a great deal of it than a little, because a small quantity might be apt to stop in the circumvolutions of the guts, and if some acid humours should happen to join with it, a sublimate corrosive would there be made; but when a large quantity is taken there's no need of fearing this accident, because it passes quickly through by its own weight."

The other remedy is a perpetual pill: "if you melt antimony over again and form it into bullets of the bigness of a pill, you have a perpetual pill, that is to say, such as being taken and voided fifty times will purge every time and yet there's hardly any sensible diminution."

# SOLID EXTRACTS

A painstaking German scientist, practiced in the juggling of trillions as a result of the approach of the mark to the absolute zero, has published some startling statistics concerning the corpuscles of the blood, those microscopic entities which give blood its color and its life-giving power. Laid edgewise in single line the corpuscles from the blood of a healthy adult would extend nearly five times around the earth at the equator. Counting five of them every second, it would require 160,000 years to count every one of the 25 billions of them. The corpuscles of two men would reach as far as the moon if placed edge to edge.

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Add to the evil smell of hydrogen sulphide, a common gas, the essence of decayed eggs, the odium of being one of the most toxic of gases. It is comparable to deadly hydrogen cyanide in its rapidity of action and the concentration from which death will result. Two parts of hydrogen sulphide in ten thousand parts of air when breathed for a few days will cause death. Weaker concentrations will cause poisoning and it is found in such quantities in some industries.

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In connection with skin diagnostic tests for hay fever and protein antipathies one experimenter records that he has never failed to observe positive results upon the scarified area when extract of human dandruff was applied thereon. That this may have a clinical significance, is the hypothesis advanced by the experimenter. For instance a protein asthmatic may be sensitive to dandruff from his own or someone else's cranial envelop.

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Drug-producing plants are not immune to the action of their own principles, Prof. Theodor Sabalitsca told a recent meeting of the German Pharmaceutical Society. Plants of strychnos nux vomica were killed, he stated, when a solution of strychnine was poured upon the ground in which they were growing. A solution of one-hundredth of one per cent. of morphine had a strengthening effect on the growth of the strychnos plants but killed them in higher concentrations.

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A poisonous substance has been isolated from the common yew tree by two Berlin scientists and has been named "taxin." It is present only to the extent of one twenty-fifth of one per cent., and is an amorphous substance of a bitter taste. A milligram injected into the veins of a rabbit causes speedy death, the "taxin" acting as a powerful heart poison.

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Exposure to radium radiation for a few hours daily over a long period has apparently been shown to be dangerous to health, says a report of the

United States Health Service. The blood seems to be especially affected, showing a reduction in the number of both the red and the white corpuscles. Blood pressure becomes abnormally low.

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Most people think of steam as something without appreciable weight simply because it is lighter than air. But as a matter of fact a molecule of steam weighs just as much as a molecule of the water from which it came. The difference is that when water is turned into steam there are fewer molecules in any given space, and consequently any given volume weighs less. Above a temperature of 39 degrees Fahrenheit, water gets lighter and lighter as it is heated. Steam, on the contrary, gets heavier and heavier if it is both heated and compressed, for more molecules are crowded into a given space.

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The recent use of hydrocyanic acid as a lethal agent, replacing the hangman's noose, brings to mind an anomalous situation: The "drug store man" particularly during this season, handles a great deal of this potential chemical. However, he keeps it fairly well harnessed in a weak, watery solution. But the peculiar thing about it is that he uses hydrocyanic acid to keep humanity from "a-coffin'—quite the opposite from the Nevada purpose.

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While it has been known that the thymus gland in man had some influence on the growth of the bones, new results show that the gland produces additionally an internal secretion and that none of the vertebrates except the mammals could reproduce their kind without it. Pigeons which laid malformed eggs, deficient in membrane and shell, were given small doses of thymus extract and soon afterwards began to lay normal eggs. Examination of the pigeons showed their own thymus glands to be diseased. Let the chicken-fancier take note.

The thymus gland lies between the heart and the breast bone. In childhood and in the young animal it is of very considerable size. It begins to diminish in size about the time of adolescence, but in human beings the partly atrophied gland persists throughout life.

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A new water-cooled X-ray tube which will make possible the shortening of the period of radiation of malignant tumors from several hours to less than fifteen minutes, has been recently developed by Dr. W. D. Coolidge.

Heretofore, in the treatment of cancer it has been necessary to use tubes with low amperage over long periods of time, the exposure to the rays being in some cases as long as twenty-four hours. The new tube permits the use of as high as 50 milliamperese to secure a voltage of 250,000, reducing the time of treatment in ordinary cases to less than five minutes.

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Since recent experiments have shown that it takes 20 grams daily of cabbage cooked in an open vessel to protect a guinea-pig from scurvy, it follows that pressure

canning or processing conserves the valuable vitamin better than home cooking in open vessels. This quickly destroys 95 per cent. of the vitamin in both cabbages and rutabaga turnips, he states. Raw cabbage is best of all—which fully justifies our contention that "saur kraut" never was intended for human consumption, although one might correctly state that what it lacks in vital principles it has in odoriferous principles.

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Baking soda, or sodium bicarbonate, which is so commonly used, and in such prodigious quantities, in the treatment of indigestion, is now stated to be highly injurious to the lining of the stomach and to the body reaction generally. Far better for the correction of undue gastric acidity are the dibasic and tribasic salts of calcium and magnesium with phosphoric acid.

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Use of thyroid extract as an anti-fat cure was condemned as dangerous by Dr. James H. Means of the Massachusetts General Hospital, in a popular lecture at the Harvard Medical School recently.

"Thyroid reduces the weight all right, but how?" he said. "By intoxicating with an excess of the thyroid hormone. Stout people who take thyroid tablets to reduce their weight correct one evil, but a worse one is produced. Experiments show that when thyroid is used the pulse goes up, the individual gets nervous, perspires to excess and feels rather done up. Hard as it may be, the right way to treat obesity is through diet restriction and increased exercise."

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# NEWS ITEMS AND PERSONAL NOTES

The following resolution was adopted unanimously and has been signed by the forty-two members of the faculty and instructional corps of the Philadelphia College of Pharmacy and Science at its monthly meeting on January 21st.

At a student forum held recently by representatives of a large number of eastern universities and colleges, complaint was made by the students themselves that they did not know where their faculties or governing officers stood on the matter of law enforcement.

The faculty of the Philadelphia College of Pharmacy and Science have long been teaching and advocating law enforcement to the classes but had never previously taken up the matter for concerted action.

The students have been officially made acquainted with the action of the faculty and have been notified that no student will be

recommended for promotion or for graduation who is found to be a law violator in connection with anti-narcotic or prohibition regulations:

> "RESOLVED, That as good citizens we, the members of the Faculty of the Philadelphia College of Pharmacy and Science, take a stand for law observance and for law enforcement, and that we pledge observance, specifically, of the prohibition and narcotic laws, in connection with which pharmacists and chemists have a peculiar responsibility as custodians of a great public trust."

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NATIONAL CONFERENCE ON PHARMACEUTICAL RESEARCH.—The National Conference on Pharmaceutical Research is now fully organized with ten main committees designed to transact its most important business. The members of the several committees are representatives of the following national organizations: American Conference of Pharmaceutical Faculties, American Drug Manufacturers' Association, American Pharmaceutical Association, American Pharmaceutical Manufacturers' Association, Bureau of Chemistry, United States Department of Agriculture, National Association of Boards of Pharmacy, National Association of Retail Druggists, the Proprietary Association and the United States Pharmaceutical Revision Committee. Other national associations have been invited to join and when they enter the research conference their representatives will be assigned positions upon appropriate committees. As to the personnel of the ten committees, we find in the list given below, professors of pharmacy, pharmaceutical chemistry and pharmaceutical botany, retail pharmacists, chemists and botanists in pharmaceutical manufacturing plants and governmental scientists. Geographically the committees include scientists from Massachusetts to Oregon and from Minnesota to North Carolina.

The ten committees follow:

*Dispensing Pharmacy:* G. M. Beringer, chairman; J. A. Koch and E. R. Selzer.

*Manufacture of U. S. P. and N. F. Galenicals:* E. F. Cook, chairman; W. L. Scoville and William Kaminski.

*Standardization of U. S. P. and N. F. Galenicals:* W. L. Scoville, chairman; Louis Emanuel, G. A. Kinsel, C. H. LaWall, J. P. Snyder and W. H. Zeigler.

*Manufacture of Medicinal Chemicals:* H. A. B. Dunning, chairman; C. J. Balliet and E. B. Carter.

*Standardization of Medicinal Chemicals:* C. H. LaWall, Chairman; E. B. Carter, W. O. Emery, B. L. Murray and Joseph Rosin.

*Sources and Identification of Botanic Drugs:* H. W. Youngken, chairman; D. E. Combs, W. O. Emery, Henry Kraemer, Albert Schneider and H. M. Whelpley.

*Standardization of Botanic Drugs:* E. L. Newcomb, chairman; G. D. Beal, W. O. Emery, E. N. Gathercoal and S. B. Penick.

*Chemistry of Drug Plants:* W. O. Emery, chairman; D. E. Combs, F. W. Heyl, Arno Viehoever.

*Biological Products:* Reid Hunt, chairman; W. O. Emery, A. D. Holmes and P. A. Pittenger.

*Business Research in Pharmacy:* A. Hunsberger, chairman; H. C. Christensen, J. A. Koch and A. W. Pauley.

ADAM PFROMM, DECEASED.—Adam Pfromm, seventy-five, died at his home, 2247 North Thirteenth Street, February 14. He was the head of one of the oldest drug houses in the country.

Born in Hesse, Germany, he was brought to this country at the age of seven, was educated in the public schools and was graduated from the Philadelphia College of Pharmacy. He entered the employ of Alfred Wiltberger, wholesale druggist, and was made president. The firm then became known as Adam Pfromm & Company, Incorporated, 233 North Second Street.

Mr. Pfromm was a member of the Philadelphia Drug Exchange, and at one time was its president, member of Chamber of Commerce, Board of Trade, and formerly vice-president of the National Wholesale Drug Association and one of the founders of the German Protestant Home for the Aged.

He is survived by a son and daughter and two brothers.

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THE KILMER SCHOLARSHIP.—A new gift to pharmaceutical research is the establishment by Dr. F. B. Kilmer, of New Brunswick, New Jersey, of a research fellowship in pharmaceutical botany at the Philadelphia College of Pharmacy and Science.

NEW BIOLOGICAL HANDBOOK.—The mail brings us a copy of a new edition of "Practical Notes on Serobacterin, Bacterin and Serum Therapy," which has just come off the press.

This booklet has been thoroughly revised and re-written for this edition and is an excellent vest pocket reference book, as it contains much useful information on these important materia medica.

It includes information on Pneumococcus Antibody Solution, on Protein Therapy, Bacterial Therapy, Endocrine Therapy, with suggestions regarding dosage, etc., also a therapeutic index.

Our readers may obtain copies of this very valuable little booklet by writing to H. K. Mulford Company, Philadelphia, Pa., and mentioning this journal.

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ANNUAL DINNER PHILADELPHIA DRUG EXCHANGE.—On Thursday evening, January 24, 1924, the annual dinner of the Philadelphia Drug Exchange was held at the Bellevue-Stratford Hotel. The toastmaster of the evening was Mr. Milton Campbell, president of the Drug Exchange and of the H. K. Mulford Company. The principal speaker was Dr. Wilmer Krusen, director of public health of the city of Philadelphia, who told of some of the difficulties arising from present conditions pertaining to his department and asked the help and co-operation of the members present. His talk was followed by vaudeville and by motion pictures which were secured during the Mulford biological exploration of the Amazon Basin.

# BOOK REVIEWS

A Laboratory Manual of Qualitative Chemical Analysis. By Theodore J. Bradley, A. M., B. S., Ph. G., Dean and Professor of Analytical and Organic Chemistry in the Massachusetts College of Pharmacy. Third Edition. vii. 172 pages. Lea & Febiger, Philadelphia, 1923. Price $2.50.

This manual is intended, as the author states, for use in a course in qualitative analysis for pharmacy students. The first section of the book takes up the elementary theory of chemistry, followed by sections on the metals, acids, solids, pharmacopœial inorganic chemicals, the general qualitative tests of the U. S. P., methods for destroying organic matter and ending with directions for preparing reagents and test solutions.

The treatment is thorough, considering the scope, and, as the author states, the course should prepare the student for carrying out "such qualitative tests as the pharmacist may be called upon to make."

The analytical methods for the group separation of the metals are arranged in tabular form, which enables the student to proceed with his "unknown" in an orderly manner. A noteworthy feature is the repetition of these analytical tables, so that the student does not have to refer back, thus avoiding possible confusion and mistakes.

The absence of any errors of consequence indicates that the manual has been carefully gone over in its preparation.—R. R. F.

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Incompatibility in Prescriptions and How to Avoid It. By Thos. Stephenson, D. Sc., Ph. C., F. R. S. Edin., F. C. S. 32 pages. 1 s. 6 d.

The text of this pamphlet appeared originally as a series of articles in *The Prescriber*, a monthly journal for both physicians and pharmacists, of which the author is the editor. The original booklet was published in September, 1915, and again reprinted in September,

1916, March, 1921, and January, 1924, surely an indication of its usefulness. In the new edition now before us the entire contents have been thoroughly revised and the incompatibility of the newer remedies has been added.

The pamphlet is well worth possessing by pharmacists and physicians and the Table of Incompatibilities on pages 27 to 30 are extremely useful to the busy pharmacist behind the prescription-counter.

OTTO RAUBENHEIMER, Ph. M.

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MEDIZINISCHE TERMINOLOGIE. Ableitung und Erklärung der gebräuchlichsten Fachausdrücke aller Zweige der Medizin und ihrer Hilfswissenschaften. Von Dr. Walter Guttmann. 16-20 Auflage mit 537 Abbildungen. Lex.-Octavo. 1328 Spalten. Urban & Schwarzenberg, Berlin & Wien.

When a book within the short space of twenty-one years undergoes twenty editions, it is a vivid proof of its popularity and also its usefulness. It is an up-to-date dictionary not only of terms used in medicine but also in chemistry, pharmacy, physics, botany and zoology. Truly a master work! Midway between a dictionary and an encyclopedia, it is a concise and convenient word-book which furnishes full definitions of the terms used in medicine and kindred branches. The wording of the definitions is clear and concise, "short and sweet," but nevertheless complete. I must not forget to mention that the author paid special attention to the etymology of words, not only their derivation from Greek or Latin but also from other languages. For instance, "Looch" is derived from the Arabic, "laûk" and "lot" from the middle high German "lôt," molten lead.

A very distinct advantage of the work are its biographies and historical information. Let me give a few illustrations:

Blaud, Paul, Fr. physician, born 1774 in Nimes, died 1858 in Paris, originator of Blaud's Pills, 1832.

Bunge: 1, Gust. v. physiologist, Basel 1844-1920; 2, Rich., surgeon, Bonn, born 1870; 3, Paul, ophthalmologist in Halle, born 1853.

Bunsen, Robert von, chemist in Heidelberg, 1811-1899, originator of Bunsen Burner, Bunsen Element and Bunsen Photometer, a short description being given in each case.

Fehling, Herm. von, chemist in Stuttgart, 1912-1885, originator of Fehling's Solution, 1848, followed by formula, etc.

Lüer, German instrument maker, Paris, died 1883, originator of Lüer Syringe, followed by description and illustration.

Trommer, assistant of Mitscherlich in Berlin, later in Eldena, 1806-1879; Trommer's Reagent (1841), followed by test, etc.

Trapp, Julius, pharmacist, St. Petersburg, 1814-1908.

Trapp-Haeser Formula for the calculation of solids in one liter of urine by multiplying the last two figures of the sp. gr. with 2.33. (It might be new to learn that the pharmacist Trapp was one of the originators of this method, as his name is usually not mentioned and the sole credit is given to Dr. Heinrich Haeser, the medical historian in Breslau, 1811-85.)

The translation and explanation of many foreign words are given, including such English terms as: Castor Oil, Cold Cream, Pain Expeller, Quaker Oats, Spruce, etc.

Besides the common prescription abbreviations we also find such odd ones as: A. D. = Aqua destillata; obd. = obduce, S. S. N. = signetur suo nomine; S. S. V. = sub signo veneni, and many others.

Botanical, zoological, anatomical, physical and chemical abbreviations are explained in detail. Under letter U we find U = Uranium; U = Urea and U = Uric Acid. We must not forget to mention the many Latin maxims, proverbs and quotations which are given and translated, including a passage from the Aphorisms of Hippocrates: "Quae medicamenta non sanant," etc.

We are indeed glad to note that Guttmann gave the originator of the Indican Reaction its correct name Obermayer and not Obermeyer like other books, including the U. S. P. IX on page 630.

On the other hand we are sorry to see how stepmotherly Guttmann treated the Master of Pharmacy, Dr. Hermann Julius Hager, as he only credited him on page 490 with one article, namely, Hager's Snuff. The preparations, reactions and tests originated by Hager would indeed fill several pages. We also miss under Lister, his ointment, which is Ung. Acid Boric.

The paper, printing and binding are excellent, as can be expected from the well-known publishers, Urban & Schwarzenberg, who are famous for their pharmaceutical, chemical and medical

texts. Guttmann's "Terminologie" is one of the leading works, if not the masterwork, and should become better known in the United States. As a "quick and ready" reference the pharmacist will find it very useful for his own information as well as for others who ask for information.

OTTO RAUBENHEIMER, Ph. M.

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GRUNDZUEE DER CHEMISCHEN PFLANZENUNTERSUCHUNG von Dr. L. Rosenthaler, Professor Universtät Bern. 2d ed. 12 mo. Pp. 115. Berlin, Verlag von Julius Springer, 1923.

The author was formerly one of the faculty at the Pharmaceutical Institute, University of Strassburg, but since its change from German to French, became associated with the University at Bern. He followed the return route which the world renowned master of pharmacognosy Friedrich A. Flückiger took in 1871 when the Germans established the Pharmaceutical Institute at Strassburg.

Dr. Leopold Rosenthaler is a recognized authority on the chemical analysis of plants. When he worked on the thesis for the doctorate, the need of a text of this sort occurred to him, which he afterwards wrote. The second edition before us is somewhat enlarged and brought up to date.

The general part describes Preliminary Tests, the method of Staas—Otto, Bourquelot's Method for Saccharose and Glucosides, the Lead Method and an excellent practical Method for Preliminary Examination.

The special part deals with the determination of Alkaloids, Glucosides, Coloring Principles, Fats, Oils, Waxes, Lecithins, Volatile Oils, Resins, Tannins, Phlobaphenes, Organic Acids, Carbohydrates, Albumins and Derivatives, Amines, Enzymes, Toxalbumins and Inorganic Constituents.

A bibliography of three pages and a complete index, three pages of double columns, conclude this excellent book, which we can highly recommend to all those interested in that important subject, "plant chemistry."

OTTO RAUBENHEIMER, Ph. M.

THE OLD DOCTOR. By Frank G. Layton, M. R. C. S., L. R. C. P. 12 mo. Pp. 170. 4 s. 6 d. Cornish Brothers, Ltd., Birmingham.

The novel before us throws some light on the medical and dispensing practice among the working class in a midland manufacturing town in Great Britain. "The Old Doctor," Luke Denison in the back streets, somewhat of a rough diamond, inspired by noble idealism and instinct with practical kindliness and good sense, is a vivid picture of the general practitioner who "did his job as well as he knew how" and who "was not out to make money in heaps like others of his acquaintance." Dr. Trelawney, the school's doctor and poet, is fond of the title," "Foddycaddy," the "short" and vernacular name for "Apothecary." The two villains in the work are Dr. Miggs, the sixpenny doctor who never made a diagnosis and dispensed a weak solution of ammonium picrate (because it was cheap) for every known disease, and Dr. McFad, with a club practise of two thousand pounds per year, with the slogan "the power to write death certificates is a very great power."

The book ends with the dawn of Lloyd George's Insurance Act, the National Health Insurance, "which puts a lid on the foul old cheap club system" and brings much-needed relief to the poor patients and also prosperity to the practitioner who will get paid for his calls. In the last chapter "Old Luke" reads to his friends the Hippocratic Oath which during his practice has always been his inspiration.

A novel well worth reading, not only by the medical but also the pharmaceutical fraternity!

OTTO RAUBENHEIMER, Ph. M.